TECHNOLOGY DEPT.

The Refrigeration Service Engineer

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DETROIT

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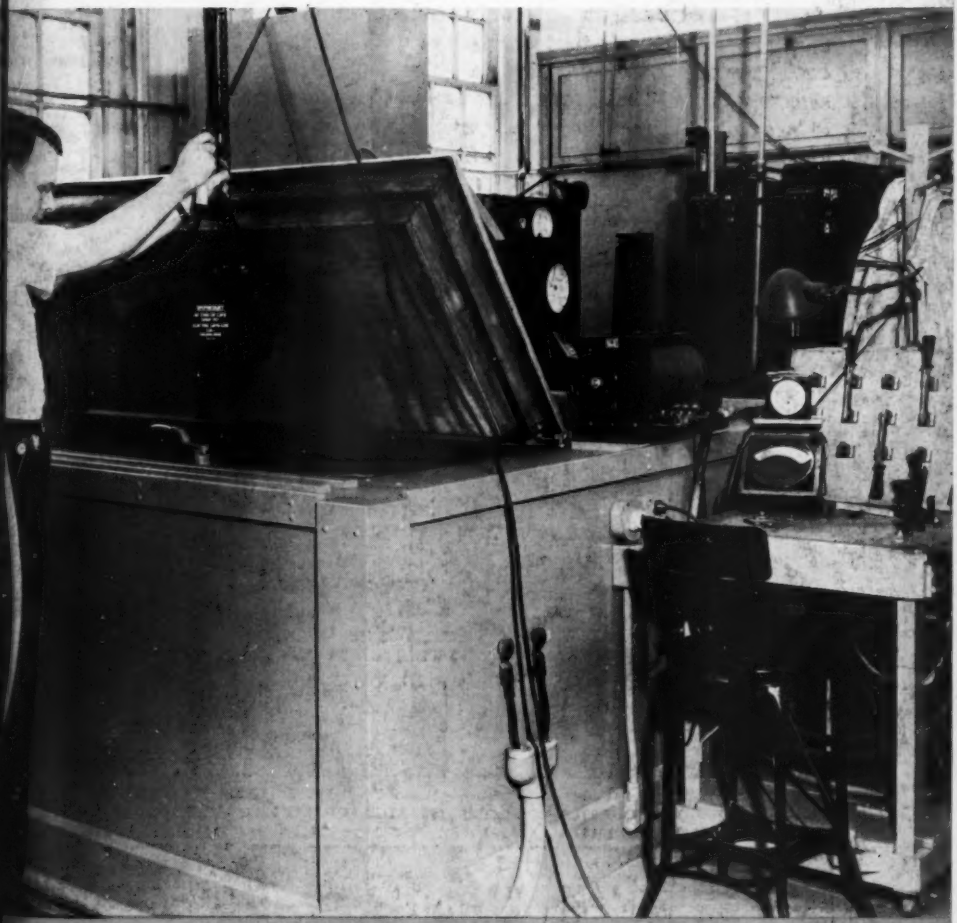
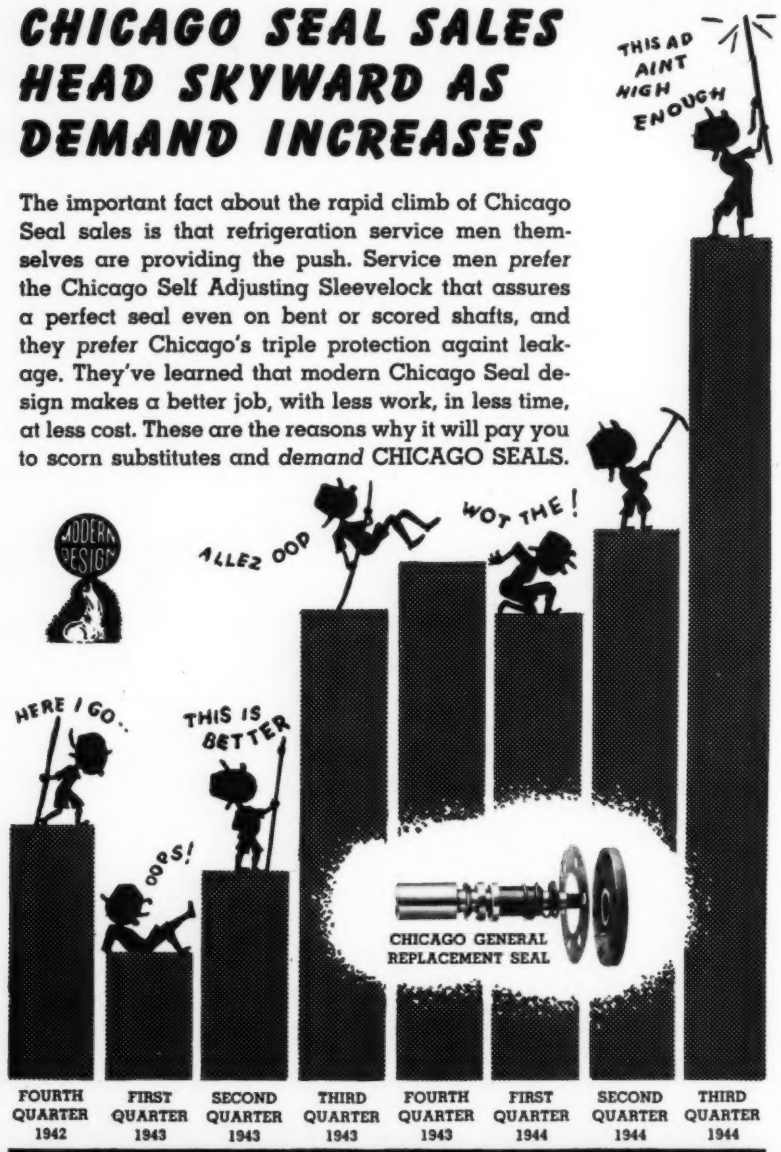


GOVERNMENT BUREAUS—NEWS AND RULINGS •
USE OF HEAT PUMPS FOR HEATING HOMES •
MERCHANDISING HELPS FOR SERVICE MEN •

CHICAGO SEAL SALES HEAD SKYWARD AS DEMAND INCREASES

The important fact about the rapid climb of Chicago Seal sales is that refrigeration service men themselves are providing the push. Service men *prefer* the Chicago Self Adjusting Sleevelock that assures a perfect seal even on bent or scored shafts, and they *prefer* Chicago's triple protection against leakage. They've learned that modern Chicago Seal design makes a better job, with less work, in less time, at less cost. These are the reasons why it will pay you to scorn substitutes and *demand* CHICAGO SEALS.



CHICAGO SEAL CO. 20 NORTH WACKER DRIVE CHICAGO 6, ILLINOIS

THE REFRIGERATION SERVICE ENGINEER. Nickerson & Collins Co., Publishers, 435 N. Waller Ave., Chicago 44, Ill. Published monthly. Vol. 12, No. 10, October, 1944. Entered as second class matter March 4, 1938, Chicago, Ill., under the Act of March 3, 1879. Subscription in the United States, $2.00 per year; all other countries, $3.00 per year.

TECHNOLOGY DEPT.

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Ansul Liquid Sulfur Dioxide is an ideal refrigerant for household refrigerators, with a long and impressive record of trouble-free performance.

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Backed by pioneers in the field, Ansul refrigerants are clean, dry and pure. Ansul service is friendly and deliveries are dependable. Phone, wire or write—today!

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Marinette, Wisconsin
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If you have need of expansion valves, solenoid valves or controls in your present production or in postwar planning, let us work with you on your problems.

Think for a minute what those words mean to a world at war, and what they will mean to a world at peace!

Think of the boys, wounded in action, who are now fighting again to return to their homes and the right to live their lives under the four freedoms.

Think of the blessings and relief from suffering these and as yet undiscovered new drugs will bring to the better world we all hope for.

Then, think that these developments would hardly have been possible without refrigeration and air conditioning.

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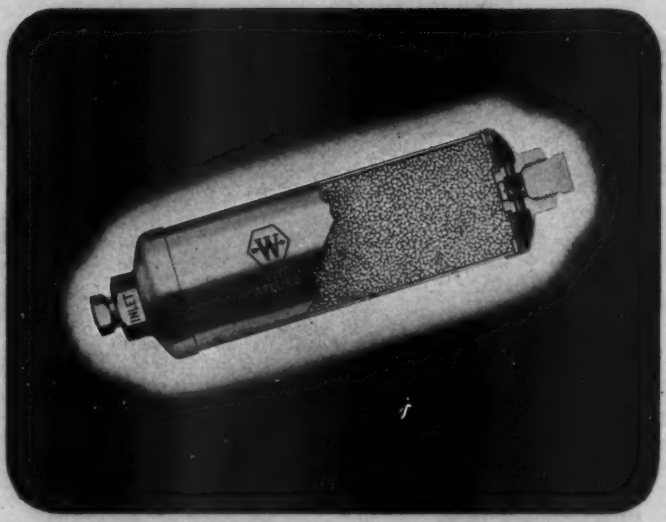

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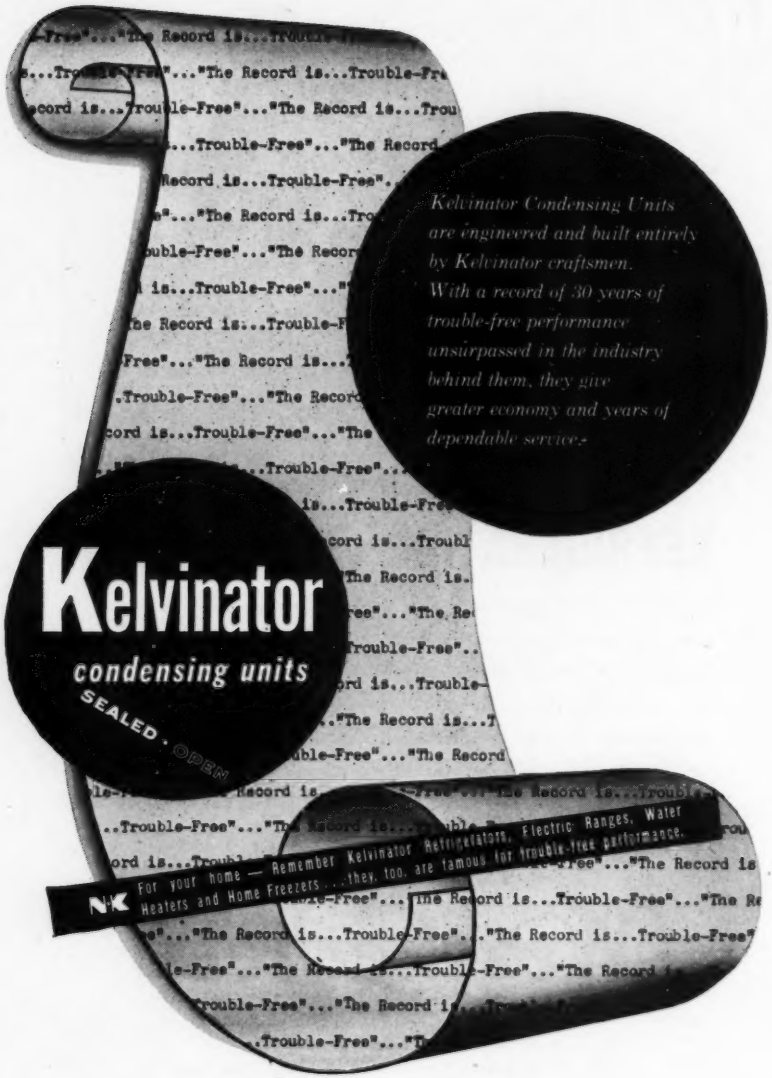
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"The Record is...Trouble-Free"

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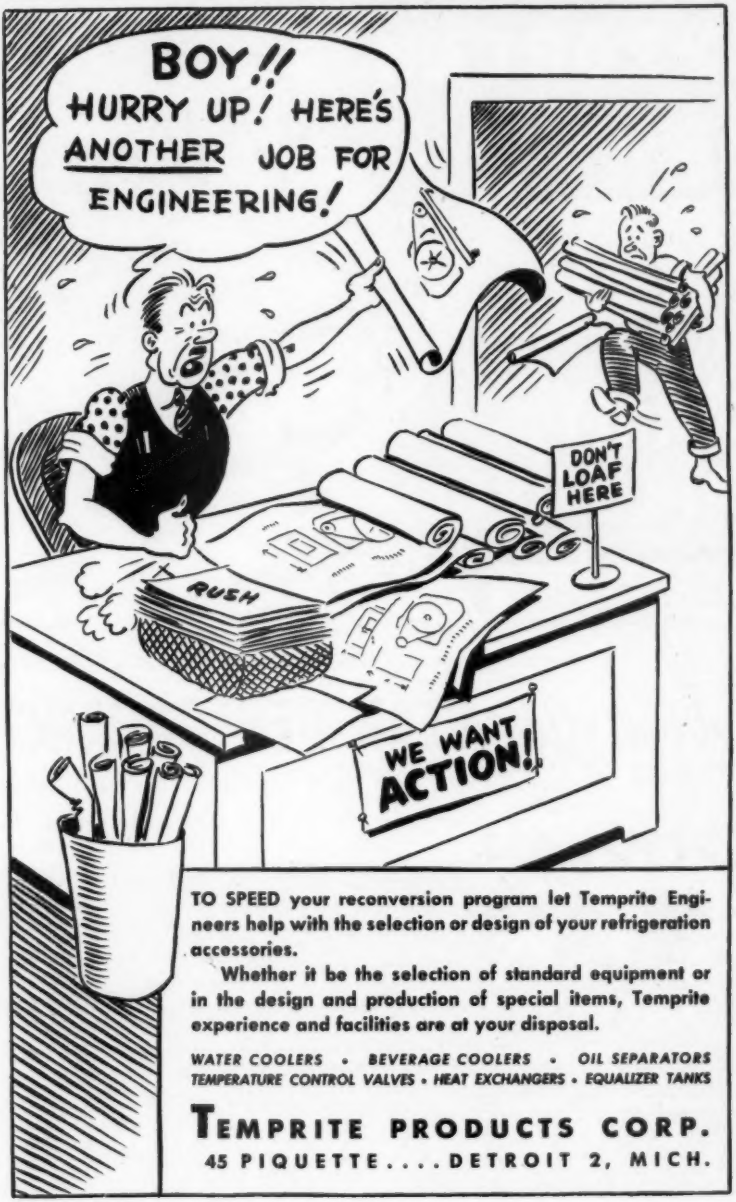

TO SPEED your reconversion program let Temprite Engineers help with the selection or design of your refrigeration accessories.

Whether it be the selection of standard equipment or in the design and production of special items, Temprite experience and facilities are at your disposal.

WATER COOLERS • BEVERAGE COOLERS • OIL SEPARATORS
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both give **PEAK PERFORMANCE**

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The PIONEER FLUID DEHYDRANT

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99.5% PURE—DRY—UNIFORM

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Purity	99.5% Methyl Chloride
Moisture	0.008% by wgt. max.
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Boiling Range (760mm)	−24.6° to −23.6°C.
Color	water white, clear

This free book is yours for the asking! Du Pont's 92-page Manual on Methyl Chloride is filled from cover to cover with practical, helpful data for every air conditioning and refrigeration designer, engineer and service man. Write for your copy today! E. I. du Pont de Nemours & Co. (Inc.), Electrochemicals Department, Wilmington 98, Delaware.

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ORDER WHAT YOU NEED, but don't hoard.

YOU CAN COOPERATE by *returning empty cylinders* promptly! That's how you can help keep deliveries moving *fast* to you and others.

Great stars in great radio plays make great entertainment . . . tune in "Cavalcade of America" — NBC Network — every Monday evening!

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BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

Still another reason...

WHY ALCO VALVES GIVE YEARS OF TROUBLE-FREE SERVICE

You have seen, in previous messages in this series, various tests that combine to assure you of years-long, trouble-free service from Alco Valves.

Here is still another test through which every Alco Thermo Expansion Valve must go before leaving our plant. It checks the "liquid side" of the valves—the underside of the diaphragm, body-diaphragm joint and gear adjustment stem—for leaks.

Valve assemblies, four at a time, are immersed in the tank of the special test fixture designed by Alco engineers. Then air pressure, 50 per cent and more higher than any refrigerant pressure the valves would handle in actual service, is shot into them. Even a single pin-point bubble in the solution means rejection.

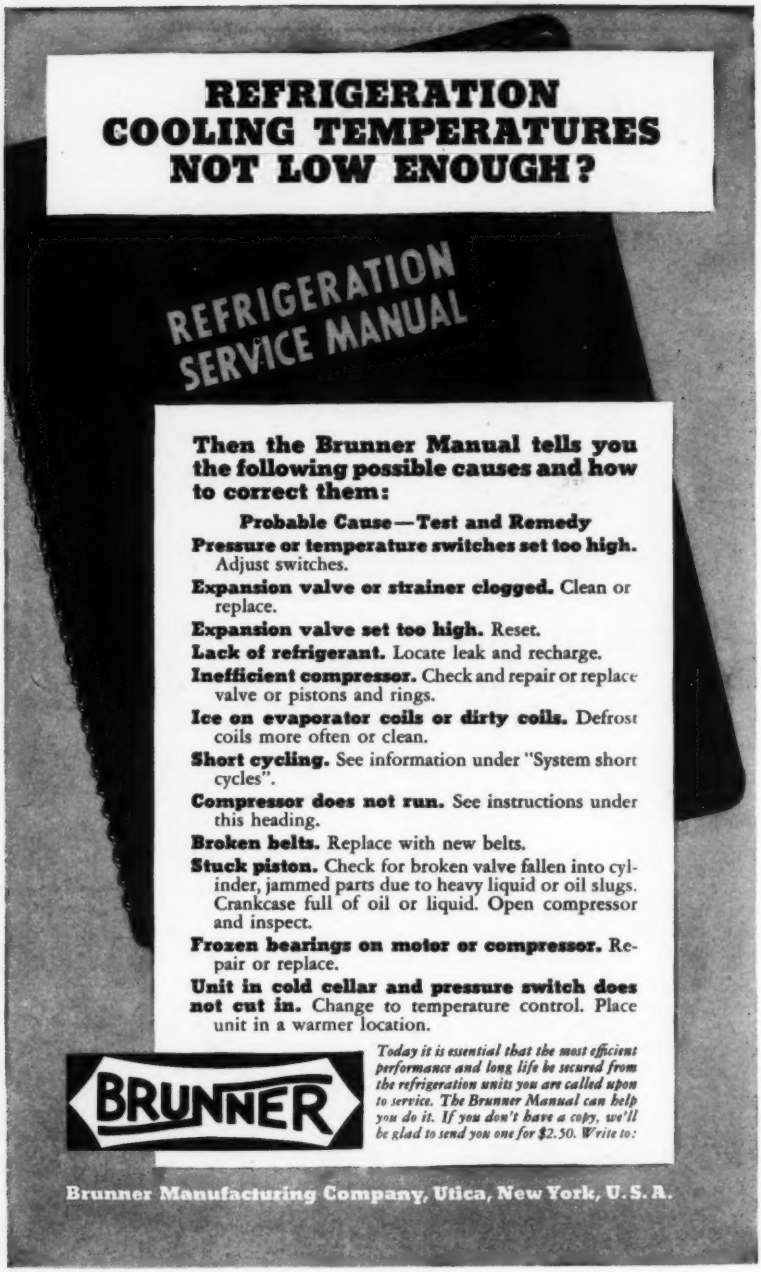
That's why we can say—"When an Alco Valve is tested, it *stays tested*." Alco Valve Company, 857 Kingsland Ave., St. Louis 5, Mo.

ALCO VALVE COMPANY

Designers and Manufacturers of Thermostatic Expansion Valves; Pressure Regulating Valves; Solenoid Valves; Float Valves.

NOW, MORE THAN EVER BUY BONDS

REFRIGERATION COOLING TEMPERATURES NOT LOW ENOUGH?



Then the Brunner Manual tells you the following possible causes and how to correct them:

Probable Cause—Test and Remedy

Pressure or temperature switches set too high. Adjust switches.

Expansion valve or strainer clogged. Clean or replace.

Expansion valve set too high. Reset.

Lack of refrigerant. Locate leak and recharge.

Inefficient compressor. Check and repair or replace valve or pistons and rings.

Ice on evaporator coils or dirty coils. Defrost coils more often or clean.

Short cycling. See information under "System short cycles".

Compressor does not run. See instructions under this heading.

Broken belts. Replace with new belts.

Stuck piston. Check for broken valve fallen into cylinder, jammed parts due to heavy liquid or oil slugs. Crankcase full of oil or liquid. Open compressor and inspect.

Frozen bearings on motor or compressor. Repair or replace.

Unit in cold cellar and pressure switch does not cut in. Change to temperature control. Place unit in a warmer location.

BRUNNER

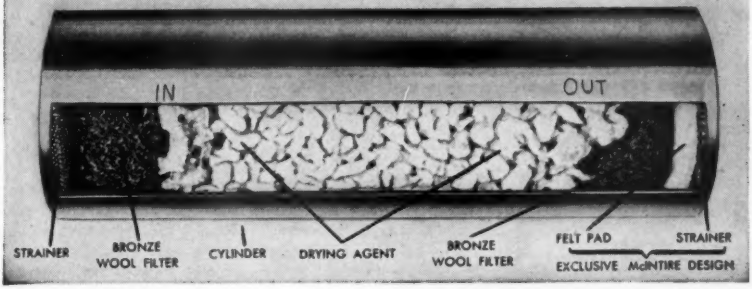
Today it is essential that the most efficient performance and long life be secured from the refrigeration units you are called upon to service. The Brunner Manual can help you do it. If you don't have a copy, we'll be glad to send you one for $2.50. Write to:

Brunner Manufacturing Company, Utica, New York, U. S. A.

WHY A REPLACEABLE CARTRIDGE IS THE BEST PROTECTION

Where systems require periodic inspection and removal of drier charge, a demountable shell and cartridge assembly is easier to refill—easier to keep clean. Danger of loose packing is eliminated. Special cartridges to meet aggravated acid or sediment conditions can be installed in the same shell. In sweat tube installations a side outlet shell with cartridge refills can be serviced by the removal of a single cap.

Why a DFN is the Best Replaceable Cartridge



A SINGLE DFN cartridge does THREE jobs. It ***dehydrates.*** It ***strains*** and ***filters.*** It ***neutralizes.*** The refrigerant is dehydrated and neutralized by a standard drying agent. An exclusive DFN strainer and filter assembly covers the COMPLETE area of the outlet with multiple layers of wire mesh, bronze wool and felt. It holds more sediment without pressure drop. It filters to minute size.

Semi-flexible DFN cartridges are easily installed and removed. DFN shells are easier to handle, last longer. They are simply constructed, with smoothly adaptable demountable flanges. DFN assemblies are manufactured in single and double flange models . . . in sizes for 1 H. P. to 30 tons, with a large safety factor. Get THREE-WAY PROTECTION with the DFN Cartridge. Sold by distributors everywhere.

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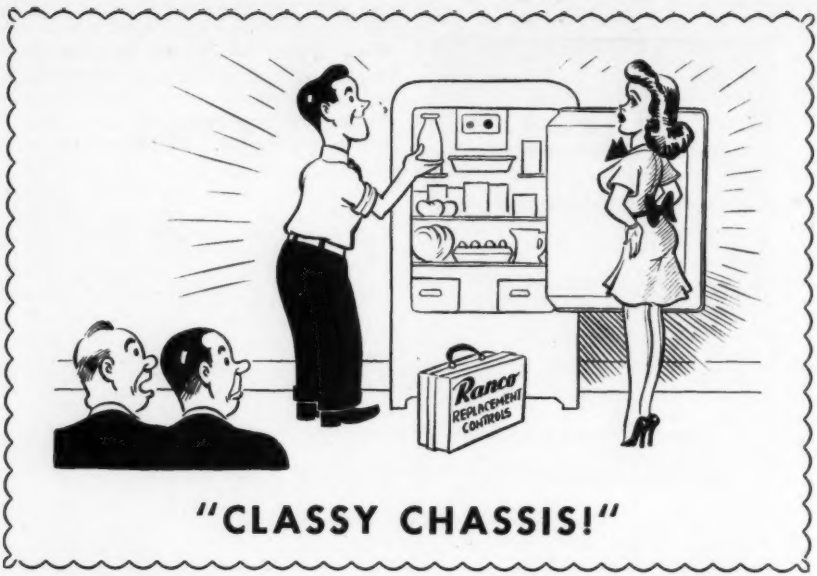
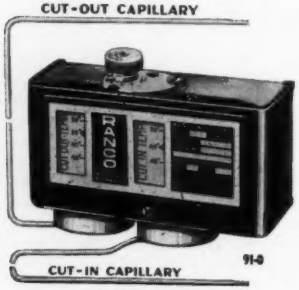
DEHYDRATORS • STRAINERS FILTERS • NEUTRALIZERS



"CLASSY CHASSIS!"



DEPEND ON YOUR RANCO JOBBER

For all types of Pressure and Temperature Controls—commercial and domestic—depend on the advice of your Ranco Jobber. He has the exact control you need, or can recommend a simple adaptation.

THE RANCO CONTROL, he means, with its good-looking construction of stainless steel base, top-frame, side-cover. Sturdy, too, for when sub-assemblies are mounted, base and top-frame are spot-welded to form one solid unit.

But interior construction counts for a lot, too, if the control is to give long-time, dependable service. In all Ranco Controls the mounting lugs, plates and studs are *welded* into place. The Overload Protection Unit's heater coil is *imbedded* in ceramic material, *anchored* in exact position in solder well—no "positioning" ever has to be done by the service man. *Precision machining* of the overload latch prevents any binding.

Yes, every Ranco Control is a "classy" job. And this same quality is *built-in* with the best materials obtainable, accurately fabricated, carefully assembled and tested. You can install Ranco Controls with complete confidence that their good appearance will be matched by their dependable performance.

Ranco Inc.

COLUMBUS 1, OHIO

The Refrigeration Service Engineer

Vol. 12 No. 10

October, 1944

A Monthly Illustrated Journal Devoted to the Interests of the Refrigeration Service Engineer in the Servicing of Domestic and Small Commercial Refrigeration Systems

Official Organ
REFRIGERATION SERVICE ENGINEERS SOCIETY

The Cover

A laboratory technician at The Electric Auto-Lite Company starts a check battery on its trip into a refrigerator for a cold test. The refrigerator is used to check the function of an automotive battery in operaton under intense cold. Tests are made to many degrees below zero.

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TABLE OF CONTENTS

Government Bureaus—News and Rulings 17
Reconversion Plans Announced 17
Steel Allocated for Mechanical Refrigerators ... 18
Materials for Installing Equipment 18
Production of Refrigerated Display Cases 18
Time Limit on Price Adjustments 18
Silica Gel Under Control 19
Use of Freon Substitutes Continues 19
Tires for Replacement 19
Purchase of Used Trucks 19
Purchase of New Trucks 20
Service Racketeers Cheat Sacramento Housewives .. 20
The Possibilities of Heat Pumps for Heating Homes —*by R. U. Berry* 21
Service Pointers 27
Diagnosing Capacitor Defects 27
Are You "Keeping Up" with Concrete? 27
Book Review 28
Commercial Selling 29
Food Expert Predicts Demand for Large Size Home Freezer 29
Modern Home Freezer Cabinet Provides Convenient Access to All Foods 30
Advertisement Tells Why Service Calls Cannot Be Answered Promptly 32
The Question Box 33
Comments on Question 613 33
Can a Heat Exchanger Be Used with Ammonia 33
Settings for Mills Freezers 33
Use of Drier Coil 34
Servicing Cooler Box 35
Frick System Frosts to Compressor 46
The Navy Feeds Its Sailors Ice Cream—Wherever They Go! 38
Youngstown Refrigeration Service Class Graduates 40
Refrigeration Training School Opened in Baltimore 42
Service Classes Train Large Group of Students ... 42
R.S.E.S. News 48
Ontario Maple Leaf Chapter Honors Service Members 48
R.S.E.S. Chapter Notes 48
Ladies' Auxiliary 56
New and Improved Appliances 54
Midwest Jobbers Association 56
News of the Industry 56

A FILTERING ELEMENT IS NOT ONLY DESIRABLE BUT IMPERATIVE IN AN EFFICIENTLY OPERATING DEHYDRATOR

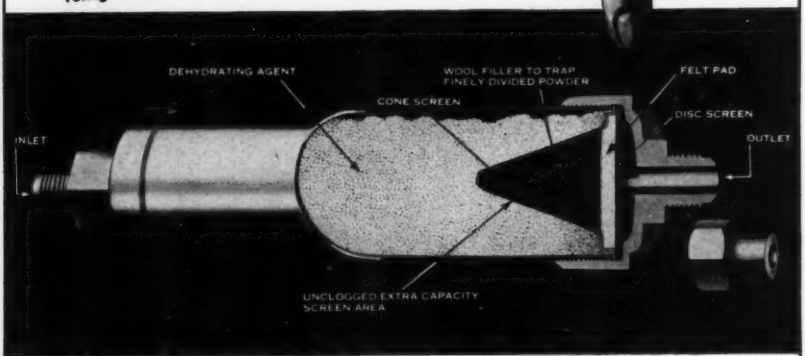
Mueller Brass Co. Filters and Driers feature the CONE SCREEN OUTLET, a specially designed filtering element that adds immeasurably to the life and efficiency of driers and filters.

Almost all crystalline dehydrating agents are subject to a certain amount of abrasion while a dehydrator is in service. Small portions of the dehydrating agent break down into very fine powder and crystals. Unless a well-designed filtering element is incorporated in a dehydrator, these fine crystals and powder have a tendency to clog the outlet filter, resulting in restriction to the flow of refrigerant.

With the MBCo. CONE SCREEN OUTLET, such finer crystals and powder are forced to the base of the cone, leaving the center and tip of the screen open to the free flow of refrigerant.

In addition, the cone screen is filled with pure wool which traps such particles that are sufficiently fine to pass through the screen mesh.

Particular attention has been paid to screen areas in Mueller Brass Co. Filters and Dehydrators, so that each size permits efficient passage to the maximum refrigerant volume that is used in a particular size refrigerant line.



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MUELLER BRASS CO.
PORT HURON, MICHIGAN

Government Bureaus — News and Rulings

RULINGS and announcements issued by the various Government bureaus, of interest to the refrigeration service industries are summarized below. Further information on any specific regulations may be obtained by writing the proper Government agencies.

* * *

Reconversion Plans Announced

THE Army, Navy, and major war agencies have unanimously agreed on a program designed to provide the utmost stimulus to reconversion when Germany is defeated, while at the same time, protecting production necessary for the Japanese war, according to a statement September 5 by J. A. Krug, acting chairman of the War Production Board.

Acting upon findings that there will be a reduction of about 40 per cent of war production within three months after the defeat of Germany which will free over 4,000,000 workers, the Board decided to:

1—Remove almost all controls over materials immediately upon the defeat of Germany except those that are absolutely necessary to assure the reduced measure of war production necessary to beat Japan. This means that all manufacturers can use any plant and any materials that are not needed for military production for any civilian production.

2—The War Production Board and other Government agencies will do everything within their powers to assist and encourage industry in resuming civilian production and maintaining employment through the "know-how" of its industry divisions and industry and labor advisory committees.

3—The Board will maintain its organization and powers so as not to relinquish authority until it is certain that the war production program is adequate for victory over Japan.

The purpose of the decision, it was stated, is two-fold. First, to assure full military production until final victory over Japan. Second, to free civilian enterprise to the utmost.

Industry is to be allowed in its own way, according to the availability of markets, men, materials and plants to do the swiftest and most effective job possible of restoring production, making whatever people want and affording maximum employment, just as quickly as possible. The plan is simple in outline. Detailed procedures for putting it into effect will be developed promptly. The plan provides as follows:

There will be only one preference rating, in addition to the present emergency AAA rating, and this rating will be reserved exclusively for military programs during the war against Japan. All other production will be unrated. Manufacturers will be permitted to accept unrated orders but they will be obliged to fill rated military orders ahead of all other business.

After Germany's collapse no programming of civilian production will be necessary. The information which the War Production Board has on the available supplies of materials, components, facilities, and manpower indicates that maximum civilian output can be achieved without detailed priorities regulation from Washington. The War Production Board will retain its Industry Divisions and its Industry Division Requirements Committees whose job will be to make certain that no one is permitted to procure an unreasonable amount of any material or product, that needed materials and components such as transportation, utilities, and fuel, and that small business is given an equal opportunity to secure materials and supplies.

Few Orders Continued

A very few allocation orders will be continued for materials that remain tight, such as lumber, textiles, and certain chemicals. For example, it will be necessary to continue strict controls of the use of lumber, particularly for major construction projects.

The Controlled Materials Plan for allocating steel and copper will be continued only for the quarter in which hostilities in Europe cease.

Paul V. McNutt, Chairman, War Manpower Commission, was present at the meeting, endorsed the program outlined and indicated that the WMC will shortly announce a program for manpower after Germany's collapse, designed to dovetail with the WPB procedure.

Steel Allocated for Mechanical Refrigerators

A RESERVE of 87,000 tons of carbon steel, plus other materials in proportion, has been set aside for the fourth quarter of 1944 to cover a number of contingent, non-military production programs set up by the War Production Board's Office of Civilian Requirements and several other programs proposed by the War Food Administration, Office of Defense Transportation and WPB's Office of War Utilities, WPB announced September 18.

Most of the programs are still in the paper stage and, even if carried out in full, would not mean that the products would be available on a wide enough scale to satisfy even the essential civilian demand, WPB cautioned. The beginning of work under them will depend entirely upon the availability of facilities, manpower and components, officials said. The proposed items include domestic mechanical refrigerators.

The WFA, ODT and OWU programs for which part of the material has been allotted and for which production feasibility is being studied are: Farm freezers for WFA, watt-hour meters for OWU and railroad passenger cars and light trucks for ODT.

Some of the factors considered in selecting the OCR-programmed items were the conservation of materials and labor and the lowering of absenteeism caused by lack of services or supplies. Production of refrigerators is needed to maintain the stockpile for blood banks, hospitals, storage of biologicals and similar essential uses and to provide for essential replacements and use where ice is unobtainable.

Materials for Installing Equipment

ANY person assigned a maintenance, repair and operating supplies symbol (MRO) and rating under CMP Regulation No. 5 may use such rating to obtain materials to install or relocate machinery or equipment, the War Production Board said August 23. This action was taken by amending direction 15 to the regulation.

Where construction is involved, officials said, persons may obtain materials needed for the installation or relocation of machinery or equipment that Direction 2 to Order L-41 (Construction) permits them to install or relocate without obtaining an outhorization from the War Production Board.

If construction is not involved, materials valued up to $500 may be obtained to install any piece of machinery or equipment rated or authorized by WPB, officials said.

Production of Refrigerated Display Cases

A REFRIGERATED display case program calling for the production of 8,000 units for the period extending from October 1, 1944, to September 1, 1945, has been approved subject to manpower clearance, WPB spokesmen reported September 16. This program is approximately 20 per cent of the 1940 production, they said. Programs for ice cream dispensary cabinets, soda fountains, frozen food dispensary cabinets and freezers, also subject to manpower clearance, are under consideration for production in the first quarter of 1945.

Time Limit on Price Adjustments

ELIMINATION of the 60-day time limit in which protest could be filed against the denial of an application for adjustment of a maximum price for commodities or service under Government contracts or subcontracts was announced by the Office of Price Administration August 30. This action, which was effective September 4, 1944, is in accordance with recent Congressional amendments to the Emergency Price Control Act under which OPA operates.

No specific statutory time limit now exists within which protests can be filed, but OPA drew attention to an opinion of the United States Emergency Court of Appeals that if the filing of a protest is unduly delayed the defense of laches (unreasonable delay) may be available to OPA. Accordingly, if a protest is filed more than 90 days after the denial order is issued, OPA will ordinarily regard the delay as unreasonable. This principle has been adopted in connection with the submission of protests against denial of adjustment applications in cases other than sales to the Government.

A second change made in the procedure for adjustment of maximum prices on commodities or services under Government contracts or sub-contracts provides that where a seller enters into a contract with two or more purchasing offices of the War or Navy Departments, situated in two or more regions, he need file his application for adjustment only in the region in which the plant is situated.

Silica Gel Under Control

BECAUSE of heavily increased military demands for the desiccant grade of silica gel for the moisture-proof packaging of war material sent to combat areas, the War Production Board placed the chemical under the control of Order M-300, the general chemicals order, September 27.

Moisture-proofing of containers to prevent mildew and corrosion of the contents is a war-developed use of silica gel, WPB officials explained. Widespread military demands for such application have caused the industry to expand from its prewar production average of 500,000 pounds a year to its present annual output of 60,000,000 pounds.

No allocation controls are placed on the catalyst grade of silica gel or on the desiccant grades that are finer than 80 mesh. The catalyst grade of silica gel is used in the petroleum industry, while the fine desiccant grades are used in industrial gas masks and for cable splicing.

Desiccant grade silica gel was formerly under allocation control of Order M-219, issued September 3, 1942. This order was revoked on February 20, 1943, because at that time the supply was ample to meet all demands.

Although military requirements consume the bulk of the desiccant grade silica gel, limited supplies will be made available for refrigeration and air conditioning to meet essential civilian needs, WPB said.

S S S

Use of Freon Substitutes Continued

USE of substitute refrigerants, such as methyl chloride, sulfur dioxide and ammonia, to take the place of Freon-12 must be continued until the Freon situation improves, according to an amendment to Conservation Order M-28 passed by the War Production Board September 27.

It had been expected that the use of substitutes in refrigerants and the restrictions on the use of Freon-12 in air conditioning would be discontinued on September 30, but an unexpected shortage of anhydrous hydrofluoric acid, a component of Freon-12, has made this impossible, WPB officials said.

New Freon facilities had been completed that were capable of producing, together with existing facilities, a total of approximately five and one-half million pounds of Freon per month. This amount of production would have been sufficient to meet all known military and civilian requirements during the fourth quarter of 1944.

The shortage of anhydrous hydrofluoric acid that has developed, however, makes it necessary to operate the Freon facilities at less than 70 per cent capacity and necessitates extending the date on which restrictions can be lifted. Anhydrous hydrofluoric acid, besides being used in the production of Freon, is also required in the manufacture of high octane gasoline and for direct military use.

S S S

Tires for Replacement

WITH many trucks and buses down all over the country, the severe shortage of heavy-duty truck and bus tires for replacement purposes will continue through the fourth quarter of 1944 and a spread of the tire shortage to the smaller size truck tires is in prospect, Col. J. Monroe Johnson, director of the Office of Defense Transportation, said September 6.

Col. Johnson said fourth-quarter tire allocations by the War Production Board for October, November and December were far below basic requirements on tires in sizes 8.25 x 20 and up. Because of its decision to satisfy expanded military requirements the WPB, in acting upon an ODT appeal from the unsatisfactory civilian allocation, increased the heavy-duty allotments only slightly and made a drastic cut in the smaller size truck tire allotments.

The resulting deficit in smaller size tires will affect principally farm trucks and those used in making deliveries of milk, bakery products, laundry and in performing many other essential services, the ODT director said.

S S S

Purchase of Used Trucks

PROSPECTIVE purchasers of used trucks are urged by the Office of Defense Transportation to make certain before acquiring the vehicles that their proposed operation meets all ODT requirements. Since October 25, 1943, the agency said, persons who were not designated motor carriers as of that date have been required to show that the operation of the truck is necessary to the war effort or to the maintenance of civilian economy.

Applications for a Certificate of War Necessity must be made and the certificate granted before gasoline allotments are made,

ODT pointed out, or, in the case of a new service, application for authority to inaugurate it must be made. These application blanks may be obtained at the applicant's local ODT district office.

Critical shortages of trucks, tires and gasoline, ODT added, make it necessary that only those operations deemed necessary to the war effort and essential civilian economy be approved, and authority to operate a truck should be obtained by a prospective purchaser before he actually buys it.

S S S

Purchase of New Trucks

DISTRICT managers of the Office of Defense Transportation have been instructed not to accept any applications for purchase of new commercial motor vehicles on the old form (WPB 663), as the new simplified form (ODT 663) is now available in all district offices, Director J. Monroe Johnson announced September 12.

"This simplified form, which became effective on September 1, following transfer of rationing of commercial motor vehicles from the War Production Board to ODT, must be used by all those applying for certificates of transfer to obtain new vehicles," Col. Johnson said.

Trucks, truck tractors and trailers are included in the rationing program now completely under the jurisdiction of the Allocation Section of the ODT Highway Transport Department, headed by Matthew E. Kane, section chief.

S S S

JURY AWARDS DAMAGES ON OVER CEILING SALE

A MUNICIPAL court jury at Cincinnati, Ohio, awarded Richard Curry, suburban Silverton $25 damages and $25 attorney fees in his $256.71 damage suit against Myron D. Green in a suit growing out of an alleged overcharge on sale of an electric refrigerator. Curry told the court he paid $175 to Green for the cabinet September 7, 1943, after which he learned that the OPA ceiling price was $89.43, and that Green had paid $127 for it in 1941.

The defendant testified that Curry offered to pay $175 and that the money had been offered back to him but the offer was refused. Curry sought triple damages between the amount of the difference on OPA ceiling price and the price paid for the refrigerator as allowed by OPA.

SERVICE RACKETEERS CHEAT SACRAMENTO HOUSEWIVES

ENTERPRISING racketeers posing as refrigerator repairmen have cheated housewives of Sacramento, Calif., out of thousands of dollars during the past few months, according to news reports. This was brought to light when a large number of complaints were filed by Sacramento people who had had dealings with these fly-by-night repairmen.

Taking advantage of those whose refrigerator units were out of commission due to long and hard wartime usage and the scarcity of reputable refrigeration mechanics, unscrupulous racketeers turned refrigerator "experts" overnight. Similar situations, it is reported, have developed in other cities.

The usual method of operation, according to W. R. Odom of the Sacramento Better Business Bureau, has been to set up shop somewhere and then solicit work. The usual procedure was to remove the unit to the shop and after 10 to 20 refrigerators had been assembled, the so-called "repairman" would go to work. He might find the point of trouble and actually repair it. Or perhaps he only fixed it so it would work for a short time.

Then, after a reasonable delay, he turns the unit over to a transfer company and bills each customer for as much as he thinks they will stand, the amount usually running from $50 to $100. The transfer company delivers the refrigerators to their owners C.O.D. Of course, the householder must pay the C.O.D. before the machine is unloaded from the transfer company's truck, so there is no chance to try it before paying up.

After paying the bill, the machine is set up. Sometimes it works and sometimes it doesn't. One Sacramentan complained to the Better Business Bureau that his ran less than 30 minutes after being "repaired."

But usually the customer still doesn't realize he has been played for a sucker. He finds that out next day when he visits the shop of the racketeer to complain, when he finds the "repairman" gone. The shop is vacant and the telephone disconnected. The racketeer has moved on. Perhaps to another town, or possibly only to another part of the city where he works the same old racket over again.

It's a quick and easy racket. All that has to be done is to solicit the repair work. A few hours is spent in getting the machine

(Continued on page 44)

The Possibilities of Heat Pumps for Heating Homes

By R. U. Berry

General Electric Co., Bloomfield, N. J.

SOME 92 years ago, Lord Kelvin first called to our attention that refrigerating systems are reversible and that they have some unusual and interesting characteristics when operated as heating systems. Interest in the idea remained very low until about twenty years ago when the development of the domestic electric refrigerator and commercial refrigeration for food preservation began to make engineers think of summer air conditioning for homes and buildings as something more than just a far off dream. Since then interest, as judged by technical publications, has steadily increased and a few actual installations have been made. Practically all of the installations were made before the war and nearly all of them are in successful operation today.

To predict that in the next ten years a substantial proportion of our homes will not be heated by heat pumps seems rash in view of the rapid development we have already seen in other types of equipment for the home. Therefore, it would appear to be of interest to analyze the prospects as they exist today somewhat sympathetically even though the way in which widespread use may be obtained is not yet clear.

Description of a Heat Pump

The heat which a domestic refrigerator absorbs from its cabinet through its evaporator does not just disappear. By means of a mechanical compressor the temperature of the absorbed heat is raised to the point where the heat can be transferred to the air outside of the cabinet through its condenser. In so doing it adds to the absorbed heat the heat equivalent of the work done by the compressor and the sum of the two quantities of heat end up as heat added to the room air surrounding the cabinet. When the reason for using the refrigerator is to take advantage of the lowered temperature inside the cabinet, it is called a refrigerator. When the primary object is to heat the surrounding room, it is called a reversed cycle refrigerator or a heat pump. The type of equipment used in either case is the same. In the case of the heat pump heating a home, instead of placing the evaporator inside of an insulated cabinet it is more effective to place it in the outdoor air or in a supply of water that can be cooled, and the condenser is usually in the form of a finned coil with a fan blowing the heated air from the coil through ducts to the house. In any case the heating of the house air and the simultaneous cooling of the outdoor air or water supply are fundamental to the heat pump, even though the outdoor air being cooled may be at a temperature well below zero.

Fig. 1 shows a simplified schematic diagram of a direct expansion heat pump. When operating in the winter time for heating, air from the house is forced through the condenser where it is heated sufficiently to satisfy the heat loss of the house. Air from outdoors is forced through the evaporator where it is cooled sufficiently to provide its contribution of heat to be transmitted to the house. The liquid refrigerant inside the evaporator is boiled by the heat from the outdoor air at a boiling pressure and temperature sufficiently below the outdoor air

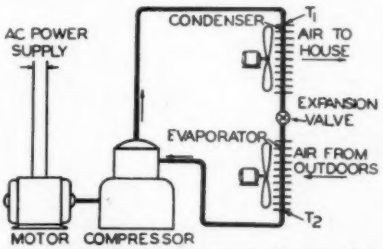

Fig. 1—Schematic diagram of elements of a heat pump.

Paper recommended by American Institute of Electrical Engineers Committee on Domestic and Commercial Applications presented at A.I.E.E. summer technical meeting at St. Louis, Mo.

temperature to effect the necessary heat transfer. The compressor draws the refrigerant gas from the evaporator and discharges it to the condenser at a high enough pressure and temperature so that it will condense and transfer its heat to the outgoing house air stream. The expansion valve maintains the pressure difference between condenser and evaporator by regulating the flow of refrigerant through the system. To use this same system for cooling the house in summer the outdoor air and house air streams are interchanged with dampers or an equivalent result is accomplished by other means.

Neglecting all losses, the heat output from the condenser of this system is equal to the heat input to the evaporator plus the electrical input to the compressor motor. Since the outdoor air is free, the efficiency of the system is the heat output divided by the heat equivalent of the electrical input and because this is always greater than 100%, it is called a coefficient of performance. The electrical input multiplied by the coefficient of performance gives the heat output to the house.

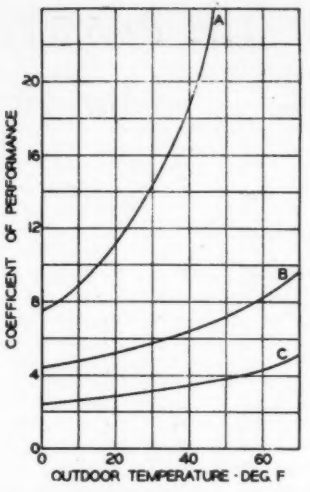

Fig. 2—Efficiency characteristics of a heat pump maintaining a house at 70° F.

Efficiency

The relative proportion of the heat obtained from electrical input and from outdoor air depends primarily on the indoor and outdoor temperatures. This is quite different from a fuel burning furnace whose efficiency is substantially independent of outdoor temperature. As in the case of a steam power plant, the heat pump is a heat engine absorbing heat at one temperature level and discharging it at another, the principal difference being that a steam power plant delivers mechanical work from the engine whereas the heat pump absorbs it. Both follow a Carnot cycle in the theoretical ideal and the theoretical ideal efficiencies are similar in form, that for the heat pump being

$$\text{coefficient of performance (C of P)} = \frac{T_1}{T_1 - T_2}$$

where T_1 is the house or condenser temperature, both being the same in the ideal, and T_2 is the outdoor or evaporator temperature. Temperatures in this case must be measured on the absolute scale. Curve A in Fig. 2 shows the coefficient of performance for a perfect Carnot engine heat pump maintaining 70° F. in a house at various outdoor temperatures. It will be noted that with a heat pump at 20° F. outdoor temperature it is theoretically possible to obtain 10.6 times as much heat in the house as would be possible by using the same power input in electric resistance heaters. In addition to a perfect heat engine this would require condenser and evaporator heat transfer surfaces sufficiently large to transfer the heat without appreciable temperature differences and correspondingly larger air flows in the house and outdoor air circuits. Sizing the heat transfer surfaces and air flows to values that would be considered practical in a summer air conditioning system of similar proportions, would give curve B in Fig. 2 where the refrigerant condensing temperature has been increased and evaporating temperature decreased a total of 60° F. This would permit delivery of heated air to the house at 105° F. to 110° F. which is considerably lower than would be used with a fuel burning warm air heating plant but not enough lower than usual discharge temperatures from a normal year round residential air conditioning system to have a prohibitive effect on the cost of fans and duct work.

Curve C in Fig. 2 shows coefficients of performance that can be obtained with refrigeration equipment available today. This curve differs from curve B in that proper allowance has been made for the use of Freon 12 instead of a perfect refrigerant, for mechanical and other inefficiencies of equipment, and for power required by auxil-

iaries such as fans. The performance indicated by this curve is believed to have been reached by installations now in operation using outdoor air as a source of evaporator heat. It will be noted that in climates such as Pittsburgh or Philadelphia, where less than 3% of the requirements of the heating season occur at below 20° F. outdoor temperature, an average coefficient of performance for the whole heating season of better than 3 to 1 can be reasonably expected.

Fuel Economy

At about 52° F. outdoor temperature the realizable coefficient of performance reaches 4 to 1. The best steam power generating plants today have an overall thermal efficiency of approximately 34%. Hence, even allowing 15% for transmission losses between the generating station and the home, the heat pump will deliver at the 52° F. outdoor condition 116% of the heat that was in the fuel burned at the generating station for supplying energy to the heat pump. Under favorable conditions the heat pump can pick up from its outdoor air more than all of the losses from the system including the heat rejected to its cooling water by the generating station.

At first glance this might appear to offer encouragement to the seekers of perpetual motion machines but a second glance reveals that while we have increased the number of B.t.u. available at the heat pump condenser over what we started with in the fuel, its temperature level would not be attractive to the central station operator as a source of mechanical work. The heat pump effects a favorable exchange of high grade electrical energy for a greater quantity of low grade heat energy and it is well known that the same favorable rate of exchange cannot be obtained in the opposite direction. However, the heat output of the heat pump is quite suitable for heating homes and even at a 3 to 1 season average coefficient of performance and 15% electrical transmission losses it gives 87% overall fuel economy. This is substantially better than can be obtained with the best domestic automatic fuel burning equipment and more than 50% better than a good hand fired domestic coal furnace will give. As time goes on undoubtedly more efficient central stations and more efficient heat pump equipment will be developed, and it is not impossible to imagine that heat pumps may some day be required just from the point of view of conservation of our national fuel resources. Curve A in Fig. 2 shows plainly that the development of this type of system is not limited to 100% fuel economy.

Of course, fuel utilization efficiency is not so interesting to the operator of a heat pump as the annual operating cost in dollars. Here there can be a considerable variation of opinion because there are no reliable statistics available on the actual average operating efficiencies of the various kinds of fuel burning domestic heating plants. If we assume hand fired coal furnaces at 55% efficiency and oil and gas automatic furnaces at 75% efficiency, they would compare as follows with a heat pump averaging 3.0 coefficient of performance using power at one cent per kilowatt hour. The heat pump would have the same operating cost as coal at 14 dollars per ton, oil at 10 cents per gallon, manufactured gas at 40 cents per thousand cubic feet or natural gas at 80 cents per thousand cubic feet. This is approximately the picture as it exists today with a heat pump constructed with general purpose refrigeration equipment in a climate such as Pittsburgh and drawing its evaporator heat from the outdoor air. It can be substantially improved by circulating more house air at a lower temperature and using larger heat transfer surfaces, thus increasing the first cost and departing from

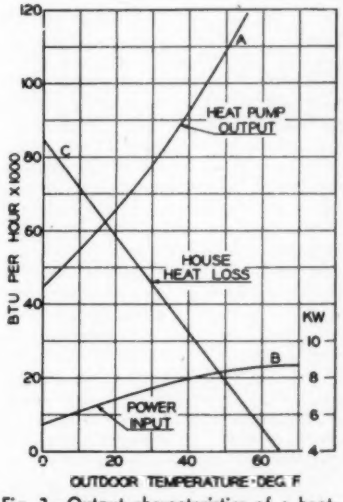

Fig. 3—Output characteristics of a heat pump with constant speed 7½ hp. compressor.

present limits of practice in year round air conditioning systems. It can also be improved by further development of the equipment or by finding a higher temperature source of heat for the evaporator than outdoor air.

The possibilities of higher temperature heat sources have been well explored but possibly not exhausted. Most city water supplies are at a high enough temperature in winter to be usable as a heat source but the cost of the water will usually exceed the power saving. The use of the heat of fusion of water by freezing ice runs into the problem of disposing of tons of ice per day per home in very cold weather. The use of well water where available for the cost of pumping can give average coefficients of performance of higher than 4 to 1 and has been used very successfully but since the availability in the United States is very limited, this furnishes only a local solution to the problem.

Output Characteristics

Curve A in Fig. 3 shows the output characteristic, calculated from test data, of a heat pump using a constant speed 7½ horsepower condensing unit with an outdoor air evaporator. In spite of the fact that the coefficient of performance or efficiency falls off at low outdoor temperatures, the power input, as shown in curve B, also falls off because of the decrease in circulation of refrigerant at low suction densities as the evaporator temperature and pressure fall. Curve C shows the requirements of a house needing 85,000 B.t.u./hr. at 0° F. outdoor temperature which would be a three bedroom house of average proportions, well insulated, in a climate such as Pittsburgh or Philadelphia. This would be a house in the $8,000 to $10,000 price range at pre-war levels. The 7½ h.p. heat pump has capacity to heat this house down to 15° F. outdoor temperature. Rather than use a larger heat pump system to take care of temperatures below 15° F. a storage scheme could be used. The excess capacity of the system at temperatures above 15° F. would be used to heat water in a storage tank to a temperature of 100° F. to 110° F. and when the outdoor temperature falls below 15° F. this reservoir of heat can be drawn upon to carry the house. The size of storage tank that will be required will depend upon the severity of the longest cold spell below 15° F. to be expected at the location of the heat pump. In Pittsburgh the size of the tank would be of the same order of magnitude as the fuel oil storage tank that might be used if the same house were heated with an oil burning furnace.

Sources of auxiliary heat other than storage can also be used where advantageous. The city water supply system is a convenient source in this case because the total usage will be small so that the cost is not important and the demand would come at a season when practically all city water systems have ample surplus capacity. A small auxiliary evaporator cooling this water would be called upon for less than 8% of the integrated heating season demand in the Pittsburgh climate.

From curves A and C, Fig. 3, it is obvious that the constant speed compressor gives far too much capacity at the higher outdoor temperatures. This is not desirable in any warm air heating system where it is likely to cause short cycling and excessive temperature fluctuation in the house. This type of system therefore requires a multispeed compressor motor or other means of capacity reduction with the necessary controls to modulate the system output to the approximate requirements of the house.

A requirement of 85,000 B.t.u./hr. to heat a house at 0° F. is composed of conduction through walls and windows and infiltration of outside air. In summer the indoor-outdoor design difference is typically only 16° F. which reduces the B.t.u. load to 19,400 B.t.u./hr. To this must be added the requirements for increased fresh air supply, people, lights, solar radiation and latent cooling of the fresh air and people. All of these can vary widely but it can be said that the majority of insulated houses of this size can be satisfactorily air conditioned with a 3 horsepower system giving from 35,000 B.t.u./hr. to 40,000 B.t.u./hr. under hot weather conditions. A few with large glass areas exposed to the sun may require five horsepower. This is typical of most of this country and brings out the fact that few summer air conditioning systems, designed as such for residential use, can be converted to heat pumps without adding capacity. Conversely, the cost of installing a heat pump in a residence involves more than just the extra cost of controls and reversing mechanism applied to a summer air conditioning system. While the capacity of the condensing unit may have to be increased in the ratio of 7½ h.p. to 3 h.p. the increase in size of heat transfer and air handling equipment will generally be much less.

Initial Cost

Any authoritative discussion of installed prices of heat pumps would be hopelessly beyond the scope of a short exposition such as this. It would involve the effects of local codes and building trades practices, methods of selling and installing, selection of installation materials and all the other things that cause large variations in prices between one locality and another and between two installations in the same locality, when the system is assembled from individual pieces specifically engineered in the field to the requirements of a particular house. Nonetheless some highly approximate estimated figures might be of value as an indication of relative costs compared to conventional systems. A warm air oil fired furnace for an 85,000 B.t.u./hr. well insulated new house might be sold for $700 today in a medium size city. This would include uninsulated duct work, grilles, oil tank and all necessary items for a complete installation with a minimum of accessories. If this installation had been purchased as a year round system, the duct sizes would have been somewhat larger, parts of the duct work would have been insulated, and the added equipment might have included a 3 h.p. condensing unit, an evaporator coil mounted in the supply duct work, an evaporative condenser, refrigerant piping, cooling controls, refrigerant and numerous smaller items. Using the same method of estimating as in the case of the simple furnace this system complete would be sold for $1650. Again using the same basis for estimating, a 7½ h.p. heat pump with two step capacity modulation, outdoor air evaporator supplemented with a 1000 gallon insulated water storage tank for peak load, and automatic controls except for manual changeover from heating to cooling would be sold for $2600. The heat pump might in some cases be entitled to a credit of approximately $150 because it would not need a chimney. These figures are not represented as being either average or typical but are prices that might be encountered in a climate such as Pittsburgh using standard heating and refrigeration equipment available today. The cooling equipment would be selected and installed by the contractor in the field from various designs and sizes of compressors, fans, heat transfer surfaces, etc. Obviously, whenever a volume is reached sufficient to justify pre-engineered packaged designs assembled in factories, the price of the complete system to the user would be considerably altered.

Energy Usage

Fig. 4 shows the effect on electric demand of installation of various types of systems in the typical six-room house in a Pittsburgh climate. Curve A is for reference and shows the average hourly demand of an all electric home containing all electric appliances except heating and air conditioning. It averages 360 kilowatt hours per month total usage and it will be readily recognized that few homes of this size actually approach or exceed this figure. Curve B shows the demand of a 3 h.p. summer air conditioning installation in the same house on a hot day when the outdoor temperature reaches 96°

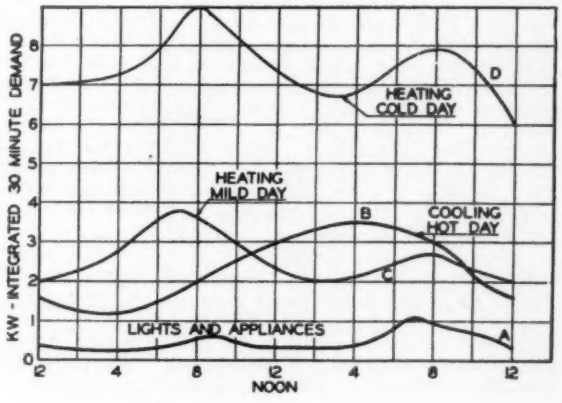

Fig. 4—Kilowatt demand requirements of a heat pump at various conditions.

F. in the afternoon. Curves C and D show hourly demand curves on a mild day and on a 0° F. day respectively for a heat pump in this house. If this house were heated with electric resistance heaters the peak demand of the heating system would be 25 kw.

Estimating the average annual energy consumption of a heat pump is obviously a tedious undertaking because the coefficient of performance is a function of outdoor temperature and the result is doubly dependent on the weather. However, approximate calculations for the average Pittsburgh climate, including both winter heating and summer cooling give a total usage of 17,000 kw. hr. per year. If Pittsburgh represents an average climate in the United States, for which reason it was chosen here, then even after all homes have reached a lighting and appliance usage of 4000 kw. hr. per year it would require installation of heat pumps in only 25% of them to double the domestic electric load.

Conclusions

Quite apart from the residential possibilities of heat pumps, these systems should receive greatly increased attention in the post war period for their commercial and industrial applications. Many industrial applications will be found where there will be an economically advantageous use for both the heating and cooling that these systems provide simultaneously. Many industrial and commercial applications will be found where summer air conditioning is necessary and where a high internal cooling load will make the cooling equipment adequate as a heat pump without increasing its size. Again, the availability of well water or process waste heat at a temperature too low for space heating but above outdoor temperature may make the heat pump, as an addition to a cooling system, far more attractive economically than in the case of the residential application.

If the increased interest is to carry over into the residential field and result in any widespread use, it is clear that further development work will have to be done. At present costs and performance it can safely be predicted that usage will be very limited except possibly in southern California and Florida where the climate is much more favorable than in Pittsburgh. However, from the standpoint of first cost it is also clear that the heat pump, when developed, will be attractive principally to those people who want and can afford to pay for summer air conditioning of their homes, and not just one or two rooms of their homes. To date, this market might be described as extremely small but promising. Equipment consisting of an electrically driven summer air conditioning plant in combination with a fuel burning furnace has reached a good stage of development and application of it to residences is well past the pioneer stage. It has not received the promotion that manufacturers and utilities gave to the household electric refrigerator, for example, when it was introduced. Certainly endeavors will be made to promote it in the post war period. The future development of the heat pump for residential use will probably depend upon the relative success or failure of these endeavors.

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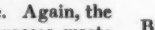
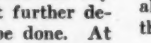


Burgess Refrigeration Service
Santa Ana, Calif.

Want to take this opportunity of telling you how much help your magazine is. It certainly is a grand reference library. I have each copy in the cover from 1936 until this year. As soon as available, I want covers for 1944 and 1945. I write on the back, in white pencil, the most used references, although it is so easy to find them the way they are indexed for the year.



THE FOSTER SUPPLY COMPANY, Buffalo, N. Y., has purchased the three-story brick building at 1071-1081 Main St. in Buffalo. The firm deals in air conditioning equipment and refrigeration supplies at wholesale. Purchase price was set at $40,000.

Service Pointers

Practical Service Men Tell How They Meet New Repair and Service Problems

UNDER this department a number of practical service men show a commendable cooperative spirit in passing on to others information on special repair and service problems that may be of much value in these trying times of material scarcity and shortage of competent help. We believe if more readers would send similar contributions, making THE REFRIGERATION SERVICE ENGINEER a medium for the exchange of information on service, much benefit would accrue to all. Similar contributions are solicited from all readers.

DIAGNOSING CAPACITOR DEFECTS

BECAUSE the capacitor is in the starting circuit, an "open" capacitor will prevent the motor from starting. If the motor is normal, it usually hums slightly but does not turn. If the motor is given a quick spin by means of the fan, it will continue to run even if the capacitor is defective but other parts of the motor are normal.

A non-starting motor does not always indicate a defective capacitor as the starting switch or starting winding may be at fault. The simplest and most effective check is made by replacing the capacitor with one of the same rating which is known to be perfect.

A shorted capacitor will usually allow the motor to start but will pass excessive starting current which will cause sudden and violent starting.

A "weak" capacitor is one which has lost capacity and will not carry enough current for properly starting the motor under full load.

The best method for testing capacitors is by means of a "condenser analyser" or capacity bridge. A number of types on the market are designed to test high capacities. The actual capacity of the capacitor can be found directly on such an instrument.

An effective and simple test can be made by connecting the capacitor in series with a 200-watt lamp on the 110V AC line. If the lamp lights dimly or not at all, the capacitor is open or weak. If the lamp lights at full brilliance, the capacitor is shorted. A normal capacitor will cause the light to burn at about ¾ full illumination.

ARE YOU "KEEPING UP" WITH CONCRETE?

IT is more or less difficult to keep abreast of the mechanics of refrigeration servicing and installation, let alone keeping up with advances made in other fields. However, concrete is required so often in refrigeration installations that I think something should be said about the strength of modern varieties after various time lapses and temperature exposures.

If you use 4½ gallons of water per sack of cement you can expect a compressive

Off the Record

By Ed Reed

"If you can't fix it, how long will the meat keep by me fanning it?" (Chicago Sun)

strength of 2660 lb. per sq. in. after one day of curing at 70° F.

Now if that same concrete is exposed to a temperature of 50° F. for two additional days the compressive strength will step up to 4200 lb. per sq. in. If the exposure is 33° F. the strength will be 3560 lb. per sq. in. And if the exposure is 16° F. the strength will be 3400 lb. per sq. in. After six days (a total of seven days) these values will be 5130, 4910, and 3470 for exposures at 50, 33, and 16° F. respectively. And after 27 additional days (a total of 28 days) the values will jump to 6850, 6310, and 3870 at 50, 33, and 16° F. exposures respectively.

If we use 6 gallons of water per sack of cement instead of the above 4½ gallons, the concrete will be somewhat weaker. Thus after one day of curing at 70° F. the strength will be 1670 lb. per sq. in. Then exposing the concrete to a temperature of 50° F. the strength will be 3380, 4440, and 5240 lb. per sq. in. after 2, 6, and 27 more days. Or, exposing the concrete to a temperature of 33° F. the strength values are 2420, 3470, and 4990 for the same number of days. And when exposed to 16° F. the strength values are 2140, 2380, and 2440, respectively for the same number of days.

Nine gallons of water per sack of cement makes the concrete still weaker, as follows: After one day of curing at 70° F. the strength will be 780 lb. per sq. in. in compression, which is only one-third of the strength when 4½ gallons are used per sack. Then exposing the concrete to a temperature of 50° F. the strength will be 1680, 2820, and 3320 lb. per sq. in. after 2, 6, and 27 more days. Now exposing the concrete to a temperature of 33° F. the strength values are 1300, 1810, and 2680 lb. per sq. in. for the same number of additional days as stated above. And, finally, when exposed to 16° F. the strength values are 1100, 1160, and 1270 respectively for the same number of additional days.

These strength values are a considerable improvement over those of a few years ago; the time requirements are vastly improved; and ability to gain strength in freezing temperatures is particularly noteworthy.

\$ \$ \$

BOOK REVIEW

AUDELS REFRIGERATION AND AIR CONDITIONING GUIDE. By Edwin P. Anderson. Published by Theo. Audel & Co., New York, N. Y. 1200 pages. Fully illustrated and indexed. Price $4.00. For sale by Nickerson & Collins Co., Chicago, Ill.

This is a new book covering the basic principles, servicing, operation and repair of household, commercial and industrial refrigeration and air conditioning. It contains essential facts for engineers, service men, shop men and users. Data is included on modern units, systems and machines, refrigerators, quick freezing, lockers, water coolers, and air conditioning systems.

That must be a very sad letter Simpson got from some fellow wanting a little extra Freon!

COMMERCIAL

INCREASE BUSINESS BY DOING A MORE EFFECTIVE JOB OF *Selling*

Food Expert Predicts Demand For Large Size Home Freezer

WHEN postwar home freezers are manufactured we can count on a very large demand for the relatively large size freezer, predicts Dr. D. K. Tressler, Manager, General Electric Consumers Institute, Bridgeport, Conn. The reasons for this were pointed out by Dr. Tressler in a talk "Home Freezers—Present and Future" before the Southeastern Freezer Locker and Home Freezer Conference at the University of Tennessee, Knoxville, Tenn., September 7.

Although the first immediate demand for home freezers may be for the 4 and 6 cubic foot size because of their relatively lower cost, it is very probable that the public will soon turn to the larger sizes, according to Dr. Tressler. A 4 cu. ft. freezer will only hold 100 pounds to a maximum 200 pounds of food. This quantity is small even for the small family. If a person purchases a home freezer and has a farm or a large garden, he will soon find that a 4 or 6 cu. ft. freezer is entirely inadequate and will want a much larger size. "It is my opinion that the farmers will want freezers of 24 cu. ft. capacity or greater," says Dr. Tressler. "Further, it is evident that the farmer and 'urban gardener' will have more use for a freezer than anyone else. Because of these facts, we can count on a very large demand for the relatively large size home freezers."

Quick Freezing Not Necessary

In speaking about home freezing, Dr. Tressler, who has spent 15 years of exhaustive research on the subject, said there is not the necessity for quick freezing in home freezers, especially for foods packed in small containers. What is important is to chill the food rapidly down to below 50° F., the point where micro-organisms grow very slowly. Adequate storage temperatures are just as important as proper freezing equipment if foods are to be kept over long periods of time without deterioration.

Dr. Tressler pointed out the need for an educational program directed to consumers to acquaint them with the correct procedure of preparing foods for freezing. "We now have a wonderful opportunity," he stated, "to see to it that everyone owning a home freezer and every locker plant operator learns how to prepare and freeze foods of superior quality."

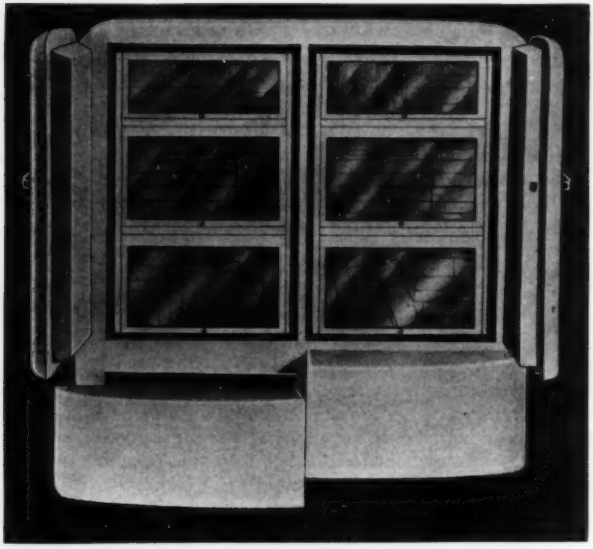
Modern Home Freezer Cabinet Provides Convenient Access to All Foods

ENTERING the home freezer market with a new "Freez-All" cabinet, the Portable Elevator Manufacturing Co., Bloomington, Ill., is now engaged in signing up distributors for post-war merchandising activities. Recently this firm had models on display at the Mid-summer Furniture Mart in Chicago, and the interest shown was highly satisfactory.

This cabinet, which is equipped with pull-out drawers, was created and developed by Roland S. Read, president of the company. Mr. Read has had much experience in refrigeration and product designing. It was his idea that people dislike being forced to stoop over to remove foods from chest type home freezers, when frequently the very item they want is the bottom package in the cabinet. He maintains that the post-war trend in home freezers is definitely toward the convenient reach-in type cabinet.

The Freez-All cabinet interior has been engineered to provide both sharp freezing and storage facilities. There are sharp freeze sections and pull-out storage drawers, each drawer having a capacity of approximately three cubic feet. The drawer arrangement permits the segregation of different classes of foods. One can be used for meats, the other for fruits, vegetables and miscellaneous. Furthermore, the meat drawer space can be divided to separate beef, lamb, pork, etc., and each of these subdivided into individual lots of chops, steaks, roasts, etc. The same plan may be used for separating the various kinds of foods in the other drawers.

In designing Freez-All, much thought was given the housewife who ultimately will use the product. It was recognized that the cabinet had to be beautiful in appearance with smooth flowing and graceful lines in order to appeal to women. In



Freez-All food freezing cabinet made by Portable Elevator Mfg. Co., Bloomington, Ill.

order to get away from the stooping necessary with chest type cabinets, a special study was made, and on the basis of this, the design was built for the average sized woman, to be sure that she could conveniently use the various sections of the cabinet without too much reaching and stooping.

Additional Storage

When the storage drawers are filled to capacity, the freezing compartments can then be used as additional storage space. The bin drawers at the extreme bottom of the cabinet can be used for freezer supplies such as containers, wrapping paper, cellophane bags, and other frozen food package materials. This part of the cabinet is not refrigerated. Capacities will range from six to eighteen cubic feet inside storage capacity.

Basing their plans on the assumption that the primary market for this cabinet will be, first, large farms in rural territory, second, small farms in semi-rural territory, and third, homes in suburban locations, the management proposes to place the bulk of its national advertising in national and sectional farm magazines.

Modern Workshop Provides Complete Facilities for Processing and Storing Frozen Foods

This modern room with base cabinets (on left) ventilated for dry vegetable storage, home freezer (in center), and storage cabinets (on right), as well as old-fashioned shelves overhead, sums up to a complete keeping-place for foodstuffs. Such rooms can be adjacent to kitchen or in basement—as generally followed in pre-war.—Photo by Edison General Electric Appliance Co.

Advertisement Tells Why Service Calls Cannot Be Answered Promptly

THROUGH a newspaper advertisement, refrigeration service dealers in Milwaukee, Wis., told their public why they could not always respond to repair and service calls immediately.

Even long hours of work, it explains, has not enabled them to catch up with the call for this much needed service, even though hard working service men are doing their utmost to keep vital equipment in good working order in spite of wartime shortages of labor and materials.

Customers are asked to wait the short time necessary for service men to "district" their calls and to make arrangements for someone to be at home when he arrives. And it is suggested that they make sure before calling a service man that the cause of the trouble is not one that they themselves could take care of.

The advertisement reproduced at the right was seven inches on two columns and appeared in the Milwaukee Journal.

Why
your Refrigeration
SERVICE DEALER
cannot always
respond to your calls
IMMEDIATELY
These days, shifts of fifteen and even seventeen hours are not at all unusual among the hard-working refrigeration service men who are doing their utmost to keep vital equipment in good working order, in spite of wartime shortages of labor and materials.
It is impossible to respond to all calls at once. Help make the calls of these trained men count. Wait the short time necessary to allow them to "district" their calls. Make arrangements for someone to be home when the service man arrives.
And make sure the cause of the trouble is not something you yourself can take care of BEFORE calling the service man.
Emergency Refrigeration Service Council
Acme Refrigeration Co.
1013 W. Lincoln Ave.
Badger Refrigeration Serv. Co.
2603 N. 60th St.
C. M. Berry
231 W. Michigan St.
Fred E. Boehme
454 N Plankinton Ave.
Otto Braun
2760 N 18th St.
John J. Geering Sales & Serv.
2840 W. Fond du Lac Ave.
Globe Refrigeration Co.
1214 N. Water St.
Ideal Refrigeration Service
209 S. 64th St.
Lohuis Co.
7315 W. Burleigh St.
Master Refrigeration Service
905 S. 16th St.
Radio Specialty Co.
829 N. Broadway
Real Refrigeration Service, Inc.
807 N 19th St.
Roth Appliance Co.
647 W. Virginia St.
Service Radio & Appliance Co.
226 W. Meinecke Ave.

Newspaper advertisement published in Milwaukee Journal by members of Emergency Refrigeration Service Council.

The Question Box

Readers are invited to send their problems pertaining to the servicing of household refrigerators and small commercial refrigerating equipment to "The Question Box."

COMMENTS ON QUESTION 613

In regard to the question No. 618, "Frigidaire Irregular" in your August issue, as most Frigidaires have pressure controls and the systems are charged with SO_2, it seems to me that zero pressure is not low enough for it to pull down before cutting off.

Another suggestion could be that the evaporator is partly oil logged, causing the low side float to operate radical. If the system is of this type, low side liquid level float, pressure control, and charged with SO_2, I would suggest first setting the control to cut off around eight inches; if this does not help, pump down and remove float to wipe out the oil.

Be careful of the oil and liquid gas left in the evaporator because as it warms up it will sometimes pop and throw oil and gas 10 ft. out the float hole.—Leon F. Walker.

CAN A HEAT EXCHANGER BE USED WITH AMMONIA

Question 622: We would appreciate your advice on the advisability of a heat exchanger outside the freezer room of our locker plant. Ammonia plant operators say the heat exchange has no place in an ammonia plant. The locker room is about 60 ft. from our ammonia compressors and the evaporator condenser. The suction line is not cold near the compressors. Would covering the suction line with cork help?

Answer: Because of the different characteristics of ammonia as a refrigerant the use of heat exchangers is not advised. For example, on a system operating between zero and 90 degrees the installation of a heat exchanger improves the coefficient of performance one per cent on a Freon system, but reduces the coefficient of performance 7 per cent on an ammonia system. These figures apply to internal heat exchange.

Your uncovered suction line does not affect internal heat exchange but loses refrigeration to the atmosphere and, therefore, should be covered. This will cut down on losses as well as give protection to the pipe against rust and corrosion.

SETTINGS FOR MILLS FREEZERS

Question 623: I have been working on an ice cream cabinet, model S251040, serial No. A829 manufactured by the Mills Novelty Co. of Chicago. It consists of a freezer, a hardening cabinet and dispensing cabinet, with methyl chloride refrigerant all installed on the same floor level. The entire unit is now working satisfactorily, except that the freezer is being used to dispense "Frosted Malts" and over a period of time (after ½ hour or 1 hour) the cream melts down, necessitating running the freezer continuously for a short time. The machine is so constructed that the freezer is automatically controlled to the desired temperature. This is obtained by a pressure control on the freezer wired in with a solenoid valve in the freezer suction line. There is a knob attached to the control with numbers from 1 to 10. The knob is turned to the desired temperature as pressure builds up in the freezer to the cut-in point, the control closes and the solenoid valve opens allowing the vapor to escape through the suction line to the compressor. As the pressure reduces to the cut-out point, the control opens and the solenoid closes. The liquid is introduced at the bottom by means of a thermostatic expansion valve.

Regardless of how cold the knob of the control is set at, the cream still melts down. It is my opinion that the cut-in point is too high. It already has made adjustments on the control so that I have no idea as to what the present setting is.

My question is, what should be the proper control setting to keep the "Frosted Malts" from melting down? I have made no adjustments on the control, as much of the time school girls are in charge and I don't want to be responsible if the machine should freeze too solid. Any information you are able to furnish will be greatly appreciated by myself and the customer. Do you think that a factory service manual covering all the equipment would be available?

Answer: The following information on control settings of the automatic regulator

AUTOMATIC REGULATOR SETTINGS 1939-MODELS

Freezer	6 QT. Pos.—#1		2½ GAL. Pos.—#1		5 GAL. Pos.—#1	
Refrig.	Cut-out	Cut-in	Cut-out	Cut-in	Cut-out	Cut-in
CH CL	14#	18#	12½#	17½#	11½#	17½#
F-12	21¾#	26½#	20¾#	86½#	19¾#	26½#

SETTINGS FOR LATER TYPE CONTROL—1939 AND 1940

Freezer	6 QT.		2½ GAL. Pos.—#1		5 GAL. Pos.—#1	
Refrig.	Cut-out	Cut-in	Cut-out	Cut-in	Cut-out	Cut-in
CH CL	15#	19#	14#	19#	13#	19#
F-12	21¾#	26½#	20¾#	26½#	19¾#	26½#

for all Mills ice cream freezing equipment has been received from the manufacturer:

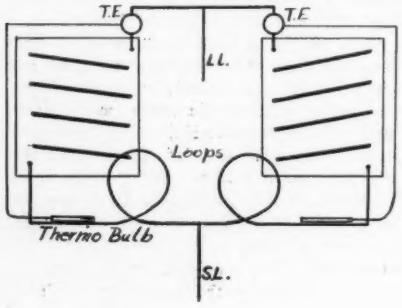
"Two different types of Penn No. 240 controls were used as a part of the automatic regulator. On the older models, the Penn control used had a one-quarter inch male flare connection and was connected to the freezer barrel by means of a piece of one-quarter inch tubing. The new type of control used a capillary tube that was soldered to the bellows of the Penn control and had a one-quarter inch flare nut on the large end of the capillary tube. The control settings for the capillary tube type automatic regulation are different than those for the older style with the one-quarter inch male flare connection:

"The automatic regulator must be set accurately, and the freezer must be pumped down and the control disconnected from the freezer barrel to make an accurate adjustment. A large accurate gauge should be used."

USE OF DRIER COIL

QUESTION 624: What is a drier coil and its functions and how is it hooked up on a double fin coil as in a walk-in cooler? On this system, I have two Milwaukee Gas Specialty Valves which I understand are not thermostatic. When the machine operates, it frosts one coil and half of the other. I believe one valve shuts off the other—i. e., gas goes from one coil of suction fins to the one operating the other valve. A service man told me a drier coil would take care of the system. I would like to know where to cut in for such a device or would it be practical to run two separate lines to the manifold and then tee it to one of the compressors? The system has sufficient gas and low and high pressure control in one unit.

I also have a forced draft problem which short cycles or long cycles. It has no control, only low pressure. I think I might need a check valve or pressure regulating valve on this unit.



ANSWER: A drier coil may be used for several purposes, the first of which is to permit liquid refrigerant to evaporate in the refrigerated space before it leaves the cabinet. In other words, a certain amount of liquid may be drawn into the suction line from the evaporator and if the suction line leaves the cabinet immediately, there is a waste of refrigeration due to the evaporation of this refrigerant on its way to the compressor.

To overcome this, a length of tubing, approximately 6 to 10 feet is looped inside the refrigerator between the evaporator and the point where the suction line leaves the cabinet. This application is where this loop gets its name of a drier coil.

Another purpose of such coils is to prevent the transmission of heat from the outside atmosphere through the tubing reaching the thermostatic bulb of the expansion valve and affecting its operation. Where there is a short length of suction line between the evaporator and the point where the suction line leaves the cabinet and where the expansion valve thermostatic bulb must be fastened to this suction line, there is a danger

of heat being conducted along the short length of suction line from the outside of the cabinet to the thermo bulb, causing the expansion valve to open up long before it should during the idle period of the machine.

A drier coil of 6 or 10 feet suction line installed inside the cabinet permits placing the thermo bulb some distance back from where the suction line leaves the cabinet; thus, overcoming this trouble.

Your particular trouble is perhaps a little different. According to your sketch, you have two coils mounted side by side, operated by separate valves and with the suction and liquid lines teed in together between the coils. According to the diagram, the liquid refrigerant that may be thrown into the suction line of one coil can pass in a direct line across to the other coil and would, therefore, affect the thermostatic bulb of the other coil holding it closed when it should be in an open position.

To overcome this, it is customary to install a length of suction line looped in an upward direction between the point where the two suction lines are teed together and the point where the thermostatic bulb is located. This loop serves as a trap which will stop the refrigerant backing up from one coil to the suction line of the other. In a true sense, this is not known as a drier coil, although it may also serve that purpose. I think this would be your best remedy for the troubles you are experiencing.

SERVICING COOLER BOX

Question 625: Recently I was called to service a cooler box and an aerator in a dairy. This box was installed about six years ago by a trained Frigidaire man. The compressor unit is a 3 hp. Frigidaire, water cooled Freon job. When the job was put in, the owner paid for 26 lbs. of Freon for the unit. This condensing unit operates a box for the storage of bottled milk, also a 12 tube 6 ft. aerator.

When I was called in, there was trouble with the dehydrator and moisture. I installed a DFN 1½ ton dehydrator and this overcame the moisture. I added 12½ lbs. of Freon and the box cooled down to 34°F. which was what the customer wanted. This brought my head pressure to 110 lbs. and the back pressure was 10. I opened the liquid line to the aerator and all twelve tubes frosted up. The room temperature was 102°F. The aerator is governed by a Frigidaire thermal expansion valve of a .125 orifice. With both box and aerator running for 15 minutes the suction line frosted back to the compressor.

Then we turned on the milk which was 120°F. This ran over a 12 tube water coil of the same length as the aerator. The water temperature was 58°F. and the milk was down to its smallest flow. As it ran into the bottler, the temperature was 40°F. as required and held that way for five minutes. The coil then started to warm up and only the lower ends were frosted. I adjusted the thermal valve in every position, but this had little or no effect. Then I shut off the liquid line to the storage box which shut off the flow of milk. The coil immediately frosted back to the compressor and the storage box held its temperature O.K. The customer wants to run 100 gallons of milk per hour at 120°F. over the aerator. The aerator has never worked right since it was installed. I claim the orifice in the expansion valve is too small. Can you give me any suggestions on this problem?

Answer: I think your analysis of the trouble is correct insofar as the thermostatic expansion valve is concerned. Without a doubt it seems to be too small. I would say in all probability that a valve of perhaps twice its capacity would be required. For example, a valve that had somewhere around 3/16 to ¼ inch orifice.

There is some basis for suspecting that the entire equipment is being overloaded, which in fact is a rather common situation to find on a milk cooling installation. So frequently the farmer's needs rise considerably after he has purchased the equipment. As a result, he finds that the equipment that he thought was going to be plenty big is considerably overloaded. The milk cooling load alone over the evaporator amounts to a good 2 horsepower load, not counting the load required for the refrigerator nor losses from the aerator.

It would be interesting to know, in fact, whether you have better success (after you put on a new thermostatic expansion valve) by closing the service valves in the liquid and suction lines to and from the refrigerator. Probabilities are that some service man, or the original installer, put these in to enable him to cut this load off the machine when they were cooling milk on the aerator or possibly simply to segregate it for service purposes.

(Continued on page 46)

Dependability doesn't happen...

IT'S BUILT INTO EVERY VALVE

A new departure in solenoid valve construction, the A-P Model 270 pilot operated Solenoid offers many unusual benefits in refrigerant control. A new quieting feature, manual operating stem in case of current failure, easy inspection on the line, "over-powered" Wrap-Seal water and frost-proof coil, handy reversible mounting bracket, and other features make it ideal for refrigeration units in grocery stores, meat markets, florists, drug stores, and other applications requiring capacities up to 18.5 tons Freon. Capacity, Methyl or Sulphur, up to 46 tons. Precision designed, dependable, sturdy, it is built for long trouble-free service. Write for bulletin 403 and service data.

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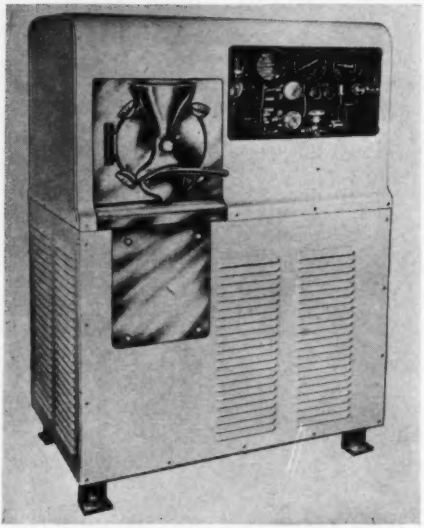
DEPENDABLE
REFRIGERANT VALVES

Stocked and Sold by Progressive Refrigeration Jobbers everywhere . . . Recommended and Installed by Leading Refrigeration Service Engineers

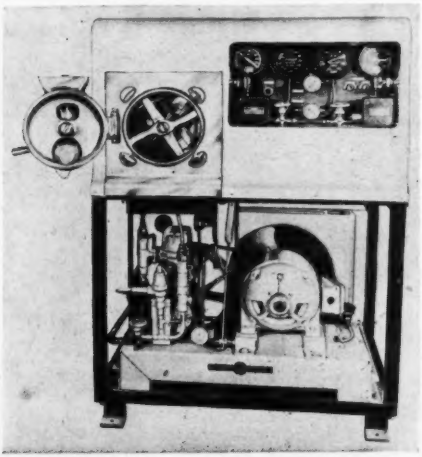
The Navy Feeds Its Sailors Ice Cream —Wherever They Go!



Front view of 2½ gallon freezer section.

SAILORS on some of the larger vessels of the U. S. Navy have for many years been able to enjoy a chocolate malted or a dish of ice cream no matter where they happened to be. This inclusion of a bit of the home town drug store or ice cream parlor in fighting ships has proved so popular that the Navy has embarked on a program of providing ice cream making equipment for practically all of its combat vessels.

The first unit in a large order for ice cream freezers and combination hardening and dispensing cabinets was demonstrated recently before U. S. Navy officials by representatives of the Bastian-Blessing Company and General Electric Company's Air Conditioning and Commercial Refrigeration Divisions, who together with the Bureau of Ships developed the new type of equipment for the Navy. Bastian-Blessing is building the freezers and cabinets and General Electric is supplying refrigeration equipment.



Front view of freezer section with condensing unit panels removed and freezer door open.

Ship's Equipment

The equipment for each ship consists of a compact freezer section and a combination hardening and dispensing unit. The freezer section has a 2½-gallon horizontal batch freezer, a gage board, and a G-E Type CM-54D, 2-h.p., air cooled marine condensing unit. The condensing unit serves both the freezer and the hardening and dispensing cabinet; a two-speed motor permitting operation of the condensing unit at half speed when the freezer is not being used. The combination cabinet has a 30-gallon hardening section, which is held at —15° F., and a 20-gallon dispensing section held at 5° F. This is the first of several orders for ice cream equipment placed recently by the Navy.

HENRY
Cross section of Type 743 Henry Dehydrator.
Greater Efficiency Because of Patented Dispersion Tube. Entire volume of the dehydrant is exposed to penetration by refrigerant.
Strainer Tube Can Be Easily Cleaned or Replaced. The reinforced monel strainer tube is silver soldered to the outlet fitting eliminating by-passing of the refrigerant.
Abso-Dry Pressure Sealing Process. Loosening of seal cap prior to installation produces hissing sound due to escape of dehydrated air indicating that dehydrant is absolutely dry.
One Piece Drawn Brass Shell. Type 743 Dehydrators in the 6" length are drawn in one so that they have only one joint—forger

Easy to clean! Easy to restore to original efficiency by merely replacing the dehydrant! These are your first reactions when you remember field problems encountered in servicing Refrigeration and Air Conditioning installations. Apart from the refillable feature, however, Type 743 Henry Dehydrator should be the choice of anyone interested in more efficient removal of moisture in a system. This is because many of the standard Henry features of design and construction that have made Henry Dehydrators the choice of the Industry are incorporated in this refillable dehydrator. You will find these features described in detail on the left.

Type 743 Refillable Dehydrator is available in a series of sizes and capacities that will take care of the majority of commercial installations. Best of all, the unit is so reasonably priced that it will pay any service or contracting organization to use it as standard equipment.

HENRY VALVE CO.

HENRY VALVE CO.

3260 WEST GRAND AVENUE, CHICAGO 51, ILLINOIS

PACKLESS AND PACKED VALVES • STRAINERS • DRYERS FOR REFRIGERATION AND AIR CONDITIONING
AMMONIA VALVES • FORGED STEEL VALVES AND FITTINGS FOR OIL, STEAM AND OTHER FLUIDS

APPROVED FOR NAVY, MARITIME COMMISSION AND ARMY USE

Youngstown Refrigeration Service Class Graduates

A CLASS of 20 newly trained refrigeration repairmen recently graduated from the refrigeration service training class established under the National War Manpower Training Program at Youngstown, Ohio. Of the 20 graduates, about half have now become actively engaged in service work and the others are arranging to get into this work as soon as they are able to obtain USES releases from their present jobs.

When the National War Manpower Training Program for the refrigeration industry was first discussed, the Youngstown Chapter of the Refrigeration Service Engineers Society immediately became interested in the project and contacted Ray Kromer who had been named national director. President E. S. Wright, of the Youngstown Chapter, who was also Area Coordinator, appointed a training committee under the chairmanship of Gene Kreitsburg to organize a class and to arrange all details of training.

This committee did a good job and a class of twenty-four men were recruited. Some of these men were already in the refrigeration industry, one a service man for a brewery, one a store fixture dealer, one an appliance dealer and one having been in service work for a couple of years. The balance of the trainees came from various other lines of endeavor, one being a bank teller, another a plant policeman, several from the steel industry, etc.

J. Dallas Nutt, manager of the Youngstown Branch of Refrigeration Supplies Co. and who also has had many years experience in refrigeration service was appointed instructor and working with Walter E. Barnhill, Supervisor War Production Training, Youngstown Board of Education, arranged

GRADUATING CLASS OF NATIONAL REFRIGERATION SERVICE WAR MANPOWER TRAINING PROGRAM, YOUNGSTOWN, OHIO.

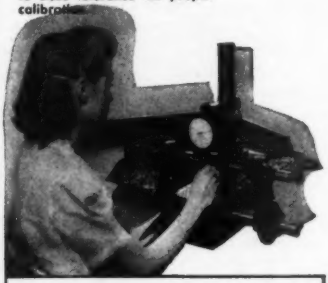
Seated Left to Right: Donald White, Charles Costello, Charles M. Campbell (Secretary, Youngstown Chapter, R.S.E.S.), Walter E. Barnhill (Supervisor, War Production Training, Youngstown Board of Education), J. Dallas Nutt (Certified Instructor, Ohio State Board of Education—Member R.S.E.S.), Eldon S. Wright (President, Youngstown Chapter, R.S.E.S.—Field Coordinator, Youngstown Area N.R.S.M. Committee), Anthony Elmo, Charles Grunewald, Clyde H. Fisher.

Standing Left to Right: William Clayton, Boris Levin, Joseph Furdas, Michael Brady, Albert Marconi, Richard Mathias, Fred C. Morris, Lloyd Coblentz, Wesley Drake, James Klaus.

Members of class not in photo: James Fercana, Fred N. Porter, Alex Brinkman, Edward Sovik, William Griffith.

CHECK ✓ AND DOUBLE CHECK ✓ ✓

Checking concentricity between thread diameter and outside diameter of unit nut — held to close tolerance for proper calibration.



IN EVERY STAGE OF PURCHASE AND PRODUCTION COUNTLESS TESTS ASSURE DEPENDABILITY OF WHITE-RODGERS CONTROLS

The accuracy and dependability of White-Rodgers temperature and pressure controls begins *when materials enter the factory.*

Every part, every assembly is checked and double checked to make sure it will perform the function for which it was designed.

These preliminary tests plus the rigid final inspection of the finished White-Rodgers control are reflected in the performance of your own equipment.

Write for your copy of the White-Rodgers catalog today!

8 EXCLUSIVE FEATURES OF WHITE-RODGERS HYDRAULIC-ACTION TEMPERATURE CONTROLS

1. May be mounted at any angle or position, above, below or on level with control point.
2. Hydraulic-Action Principle incorporating solid-liquid filled bulb and capillary provides expansion force comparable to that of a metal bar.
3. Diaphragm motion uniform per degree of temperature change.
4. Power of solid-liquid charge permits unusually sturdy switch construction resulting in positive contact closure.
5. Heavier, longer-wearing parts are possible because of unlimited power.
6. Dials are evenly and accurately calibrated over their entire range because of straight-line expansion.
7. Controls with remote bulb and capillary are not sensitive to change in room temperature. Accuracy of control is not affected by temperature changes in surrounding area.
8. Not affected by atmospheric pressure. Works accurately at sea level or in the stratosphere without compensation or adjustment.

Electrically and mechanically checking spring pressure to assure complete range of control operation.

Checking form of gear teeth and relation to shaft assembly over entire circumference by exacting comparator method.

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Controls for Heating • Refrigeration • Air-Conditioning

for classrooms in the South High School Building and gathered all necessary material and other items necessary to properly conduct this training.

Classes were held three nights per week and twenty of the twenty-four starters attended all classes and worked hard and enthusiastically to get everything they could out of this training. The various contractor members of Youngstown Chapter and Refrigeration Supplies Co. furnished all necessary equipment and supplies needed by the class.

Showing the esteem in which this course is held, members of the school staff display with considerable pride a letter received from Walter E. Barnhill, supervisor, War Production Training, Youngstown Board of Education, which reads as follows:

Dear Mr. Wright:

This letter is to express to you my appreciation and thanks for your generous cooperation as field coordinator for the duration of our program for the training of refrigeration service men for local contractors.

The quality and effectiveness of our trainer, Mr. J. Dallas Nutt, has been an inspiration to the training, and has been an important factor in maintaining unusually high attendance throughout the training program. The careful selection of trainees is another factor which contributed to the success of the program. It has been a genuine pleasure to have had a part in a program where cooperation and quality leaves nothing more to be desired.

S S S

REFRIGERATION TRAINING SCHOOL OPENED IN BALTIMORE

TRAINING in refrigeration for men and and women war workers is being offered in Baltimore, Md., by the Vocational War Production Training Program under the Department of Education of the City of Baltimore. The school was opened September 13 at the Vocational School of Baltimore, Howard and Center Sts.

Its purpose is to provide basic training for those interested in preparing for entrance into the field of refrigeration service. It was planned to interest new workers in entering the field of refrigeration service, thus providing needed manpower for replacement and expansion; to upgrade present workers in certain phases of theory and practice in refrigeration; and to offer further specialized training that might be needed.

Mayfort Miller will conduct a class on complete refrigeration servicing on a five-day per week schedule, 8:30 a.m. to 3:00 p.m. Walter Volker and other instructors will conduct classes on condensing units, theory and practice, on a night basis Monday and Wednesday or Tuesday and Thursday, 7:00 p.m. to 10:00 p.m. In these classes all unnecessary facts have been eliminated and the necessary instruction compressed into small doses within the range of all. There is no charge for enrollment.

There will be a course for beginners and an advanced course. Each unit will require a total of 100 hours instruction. A United States Government certificate and diploma will be awarded those who complete the course satisfactorily.

S S S

SERVICE CLASSES TRAIN LARGE GROUP OF STUDENTS

A TOTAL of 5,000 trainees have been enrolled in 127 schools operated in connection with the National Refrigeration Service Council. A report containing these figures was presented by Ray Kromer, director of training, to a meeting of the council held in Washington, D. C., on September 11. Many of the schools are well along in their courses and the trainees have added needed manpower to assist in maintaining refrigeration service in recent months.

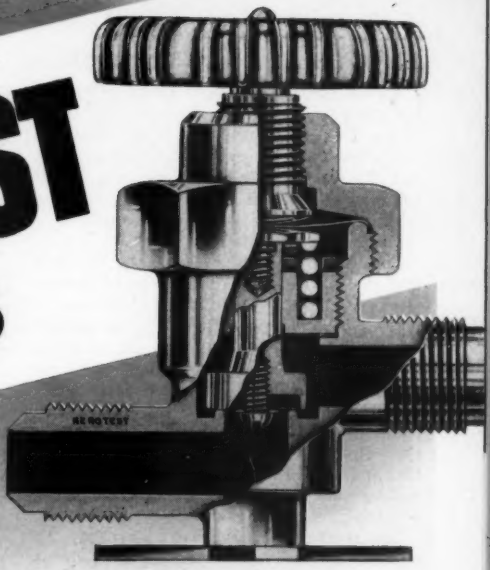
Experience, according to Mr. Kromer, has shown that one third of the trainees do not finish the course or remain in this type of work. Therefore it is expected that the schools will add 3,300 men employed in the refrigeration business as helpers. While this number is considerably less than the losses in service men to the armed forces and other activities, it constitutes a valuable addition to assist in carrying on the work.

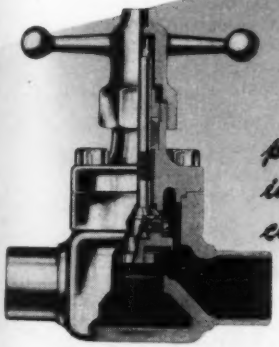
After a full discussion of the council activities it was decided to continue to give assistance to those schools organized before the end of the year. Meanwhile a full report of the council's activities will be prepared and distributed to contributing agencies and the refrigeration industry.

S S S

The Service Refrigeration Company has been organized at Modesto, Calif., by Joe Shapro and Othel Robbins. Both men have had more than 20 years' experience in installation and repairing of refrigerator equipment. The shop is located at 600 H St.

KEROTEST VALVES





pioneers for over 2 decades in important developments for better control of

AIR CONDITIONING
REFRIGERATION EQUIPMENT

"It's been through the mill"—that's the accepted phrase for equipment that can take *tough service.*

Kerotest Valves have certainly *"been through the mill"* . . . accepted as the standard of quality and dependability in pre-war days, then serving—through Kerotest's doubled and tripled production capacity, without sacrifice in precision—the world's most critical customer, *Uncle Sam.*

With *Victory,* KEROTEST will again lead in providing important precision-built developments for better control of Air Conditioning and Refrigeration Equipment. Send us *your* specifications!

Dependable KERO TEST *Valves*

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PITTSBURGH, PA.

EMPLOYMENT ON A SHARE BASIS

OPERATORS of service businesses often find it difficult to arrive at a fair basis of pay for field service men. A basis through which the operator may make a fair profit and the service man may receive pay commensurate with the work he does and the interest he takes in the problems of such a business.

Consideration must be given to the fact that the service man while in the field is on his own. Upon his ability and business integrity depends the success or the failure financially of the work he is doing.

It is generally conceded that two men working as partners will each fare better than either the operator or the service man he employs. For this reason it has been suggested by one reader of these columns that the service man be given a partnership and interest in the work he does through the following basis of pay:

The service man may work any hours he wishes. In return he receives one-half of the field labor charges, 10% of the retail price of material sold and 5% of all money he collects C.O.D. He must take all repeat calls on his own time without pay. Warranties and mileage outside of a fixed area are handled separately.

REFRIGERATING FIRM SUSPENDED

AN order by WPB has been issued the Sun-Ra Frozen Foods, Inc., Kansas City, Mo., engaged in the sale of frozen foods and in the manufacture, sale and servicing of refrigeration systems of equipment, suspending the company from applying or extending any preference ratings and ordering all preference ratings which it has applied or extended cancelled for two months, effective September 25.

The company was charged with violating provisions of Order L-38 in the purchase of refrigerating equipment, assembling frozen food cabinets, selling refrigerated cabinets and constructing a frozen food locker plant.

Thomas G. Eastoe
Brisbane, Queens, Australia

I have read with interest and appreciation many articles in the REFRIGERATION SERVICE ENGINEER. I think it's a well written technical book and not too deep, because I spend hours on mine, in fact I treat it as a night's entertainment—yes it's good.

LETTER FROM NEW GUINEA

REFRIGERATION SERVICE ENGINEER:

All of us here read your magazine with great interest. We are especially interested in your articles on new equipment and developments. It gives the boys a chance to keep up on things even though they are a long way from home.

Service here in New Guinea certainly takes a man's ability. Besides maintaining our own equipment, we do considerable repair work to help others. It is this latter work which really presents the problems. We have to do things here that would have caused us to gasp in horror back in the States. Some of the outfits we have seen would put "Rube Goldberg" to shame. The best part is, with a little fixing, the things do get cold. Had an "Aussie" made compressor which had been out of use so long that the shaft seal bellows had disintegrated. The only seal we could get was for a Norge Rollator. It took quite a bit of changing but it didn't leak.

Yours truly,
DONALD MARCY.

RACKETEERS CHEAT HOUSEWIVES

(Continued from page 20)

in temporary working condition and the transfer company delivers and collects the bills. A quick move and there are no wrathful customers to face.

It is suggested that legitimate refrigeration servicemen watch for such operators and cooperate to prevent this situation developing in their own cities.

NEW SERVICE CONCERN

ARTICLES of incorporation have been filed in the Wisconsin secretary of state's office at Madison for the Refrigeration Maintenance Corporation, Madison, Wis. The new concern will buy, sell and deal in refrigerators, refrigeration equipment, etc. Incorporators are Lee A. Niles, Jerome A. Felt, and Anna T. Niles. Both Niles and Felt have been engaged in the servicing of household and commercial refrigeration and air conditioning. The establishment is located at 731 University avenue, Madison, Wis.

The Proof *of the* Product is *TIME*

TIME marches on—irresistibly, without bias or prejudice—discarding by the roadside false hopes and ideas, retaining those things that have made a contribution to the comfort, happiness, and understanding of the world. Human mind is limited and subject to error, but time sifts the chaff from the wheat with absolute infallibility.

Time marches on—in refrigeration. Since Pearl Harbor, while the industry has put its efforts mainly to creation of more and more diabolical instruments of destruction, time has continued its constructive criticism.

Unhampered by urgencies of production and exactions on inventive skill, time has disclosed the weaknesses in prewar units and proven the sound engineering ideas.

Time marches on—with Chieftain. Time has proven that the fundamental engineering and production methods of Chieftain are correct. This has been demonstrated in the service-free performance of hundreds of thousands of Chieftain units during wartime and by the insistent demand for Chieftain units as a replacement for many other units that have failed and been discarded by the wayside.

The postwar Chieftain—more particularly the hermetic—has additional safeguards against electrical failure, thereby allowing greater flexibility in application. It now can be used with restrictor tube, float, or expansion valve or other expansion means. A greater range of sizes, more perfect balance and even greater quietness and freedom from vibration are other outstanding characteristics.

Time marches on—in our customer's plant, demonstrating what is necessary for proper design and installation in order to assure trouble-free service of the completed product.

Before deciding on your postwar refrigerating equipment investigate CHIEFTAIN, "Proven by Time".

Chieftain

TECUMSEH PRODUCTS CO.
TECUMSEH • MICHIGAN

THE QUESTION BOX

(Continued from page 35)

FRICK SYSTEM FROSTS TO COMPRESSOR

QUESTION 626: I have an air conditioning unit as follows: 2—8¾ in. x 6 in. compressors, 50 hp. motors and 1—7¾ in. x 5 in. compressor, 40 hp. motor; all Frick units. Central refrigerating unit with two evaporative condensers, float control system for flooded operation evaporator, Freon receiver exchange filter on oil exchanger, dehydrator, etc., with a suction pressure regulating valve and liquid ejector for oil recovery. Use three American Blower capillary air washers with reheat coils. Having chilled water through the evaporator and pumped upstairs for distribution through air washers. Oil through accumulator to crank cases which are all connected together. It has 15 lb. higher pressure than suction pressure. Chilled water entering evaporator at 44°F. and leaves at 38°F.

This is the general setup and it seems to be operating satisfactorily but there is a heavy accumulation of frost on the suction manifold and on the sides of the cylinder wall. Will this injure the refrigerator unit?

I have a throttling valve at the float assembly but if I throttle this, will I not have oil logging in the evaporator? I was assigned to find the trouble with the refrigeration last winter.

ANSWER: From the facts you give, it is apparent that the system did lack Freon before you charged the additional quantity into it. Since the system is now frosting back to the machine, some engineers might be inclined to jump to the conclusion that the system now has an overcharge, but your description of present operation indicates that any such quick conclusion would be in error.

The float control on the evaporator, if it is in proper operation, would not feed a surplus of refrigerant to the evaporator regardless of any possible overcharge in the system. An overcharge would fill the receiver and if it was way over would float back into the condenser and raise the condensing pressure because of the surplus thus made inactive.

I am inclined to believe that the float control on the evaporator has been out of adjustment for some time but this condition was not apparent because of the deficiency of refrigerant in the system. When you gave the system the proper charge, the maladjustment of the float valve showed up in feeding too much refrigerant into the evaporator. The float valve should now be adjusted so that it operates correctly without freezing back to the compressors.

You asked about the effect of frosting back to the machine. While this is not so serious on a Freon compressor as it would be on an ammonia compressor, it still is not good operation. If the liquid comes back in slugs, it lifts the safety head and will make it leak. Furthermore, the wear on the cylinder walls is increased and the efficiency of operation is lowered. For this reason, it would be well to adjust the float valve to have a few degrees of super heat in the suction gas at the machine. I trust the evaporator and suction system are designed properly so this will not prove too difficult.

NEW SERVICE CONCERN OPENS

THE United Appliance Service, engaged in the servicing and maintenance of domestic and commercial refrigerators, has ben opened at 3908 Troost Ave., Kansas City, Mo. The concern is headed by Nelson Warren, who was manager for the Kansas City Stove and Electric Co. for the last nine years. The personnel includes three service men all of whom formerly were associated with Mr. Warren.

GORDON A. BURNS WITH CANADIAN TRADE JOURNAL

GORDON A. BURNS, Toronto, past International president (1940), Refrigeration Service Engineers Society, recently resigned his position with Kelvinator of Canada, Toronto, to accept the position of Editor of the Canadian Refrigeration Journal. He retains his active interest in the Society and is at present serving as treasurer of Ontario Maple Leaf Chapter.

SERVICE FIRM ADDS TO STAFF

ERNEST O. HENSE has joined the staff of the New Air Conditioning & Refrigeration Service Co., 6946 Stony Island Ave., Chicago, Ill., as a field consultant and supervisor. Mr. Hense comes to his new position from the Refrigeration Maintenance Corp. of Chicago, serving there as a supervisor in the loop territory for the past five years.

YOUR BEST WEAPON IN THE WAR ON MOISTURE

One piece streamlined shell provides greater strength than old designs—facilitates flow of refrigerant.

Filled with Silica Gel

Copper and brass construction throughout

Finger type strainer of 200 mesh bronze screen, integral with outlet connection. Simply unscrew connection to refill dehydrator or clean screen.

Brazed — no soft solder joint that might loosen.

Fewer joints —less chance for leakage

Available in sizes up to 7 H.P.

Easy to refill—no bolts to unscrew and no flanges, springs or loose screens to remove before refilling

The TORPEDO that smashed old ideas of Dehydrator design . . .

● When the Imperial Torpedo Dehydrator was announced in 1940, it introduced an entirely new conception of dehydrator design and dehydrator efficiency.

It pioneered the one piece streamlined shell (from which it took its name "Torpedo"). This design offers such marked advantages as greater strength, easier passage of refrigerant and fewer joints.

And it introduced the finger-type outlet screen which provides more efficient filtering, less chance of clogging and easier removal for cleaning and refilling.

Sectional view above evidences its leadership in design and shows why it has won widespread preference in the industry,

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Refrigeration Service Engineers Society

Official Announcements of the activities of the International Society and Local Chapters appear in this department as well as articles pertaining to the educational work of the Society.

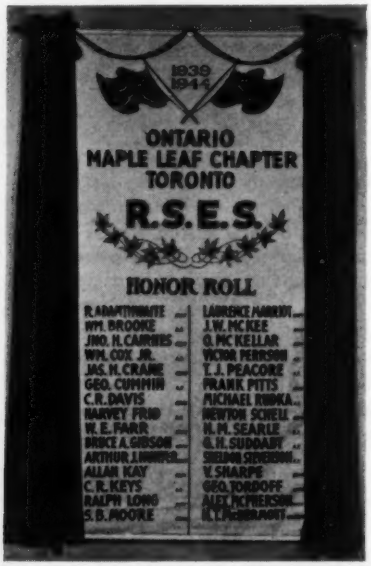
THE OBJECTS OF THE SOCIETY

To further the education and elevation of its members in the art and science of refrigeration engineering; for the reading and discussion of appropriate papers and lectures; the preparation and distribution among the membership of useful and practical information concerning the design, construction, operation and servicing of refrigerating machinery.

INTERNATIONAL HEADQUARTERS: 433-435 North Waller Ave., CHICAGO 44, ILL.

ONTARIO MAPLE LEAF CHAPTER HONORS SERVICE MEMBERS

A PERMANENT honor roll is the proud possession of Ontario Maple Leaf Chapter, Toronto. It was dedicated at the last annual Spring Conference of the Interprovincial Association.



Recently the Chapter mailed a package to each of the members appearing on the honor roll, providing them with news of the Chapter activities. The honor roll is approximately four feet high, attractively painted, with velour drop curtains on either side.

NEW CHAPTER FORMED AT DUBUQUE, IOWA

THROUGH the efforts of C. J. Brashaw of the Iowa Engineering Company at Dubuque, Iowa, a meeting of service men was held Monday, October 2, which resulted in the signing of a petition for charter for a Chapter at Dubuque to be known as the Key City Chapter No. 1. Thirteen service men signed the petition, which is being held open to permit additional applications to be included in the charter.

R.S.E.S. Chapter Notes

WESTERN MASSACHUSETTS CHAPTER

Springfield, Mass., Sept. 29—Through the summer, the Chapter has held regular monthly meetings which have been well attended. A number of members visited the East Hartford, Conn., Chapter after having a former visit from them. All seemed to enjoy this opportunity of meeting members of other Chapters and exchanging views.

During the last of August, an outing was held at the summer home of Bro. Lindberg at Lake Congamond, Southwick, Conn., by members and wives and friends. About 50 were there and all declared Mr. and Mrs. Lindberg an ideal host and hostess. It was a beautiful day and many remained out of doors, going swimming or walking under the pine trees, while others stayed inside and played games. A fine luncheon was served. Guests were present from Hartford and New Britain, Conn. Chapters. Moving pictures of the party were taken to be presented at later meetings.

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4. AIR CONDITIONING SYSTEMS

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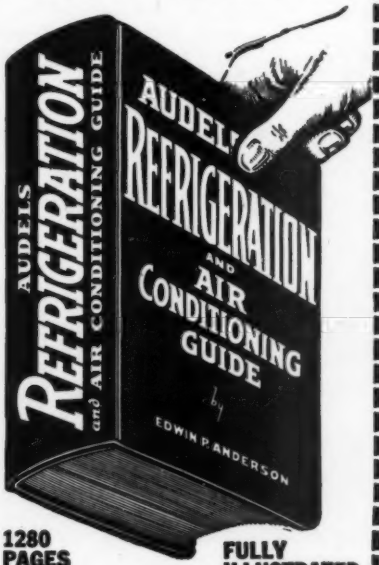

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DAYTON CHAPTER

Dayton, Ohio, Sept. 14—The meeting was held at the Allied Parts office with a fair attendance. An interesting and educational session was based on a list of questions and answers. Some interesting discussions were brought up and it is planned to arrange for a similar program to be given at a future chapter meeting.

EVANSVILLE CHAPTER

Evansville, Ind., Aug. 31—It was a red letter day for the Evansville Chapter to be honored by the presence of E. A. Plesskott, National President of the R.S.E.S. and P. B. Reed, Chairman of the National Educational Committee, who were guests at the dinner meeting held at the Kennel Club.

Mr. Plesskott presented the Charter to Wm. E. Anglin, President of the local chapter and Mr. Reed gave a talk on the history of refrigeration and prospects of future growth of the refrigeration industry.

Thirty-four members and guests attended, including the newly elected officers, who are: *President,* Wm. Anglin; *First Vice-President,* Earl Kinsey; *Second Vice-President,* Howard White; *Treasurer,* Charles Powell; *Secretary,* Ben Griese.

W. J. Aulsebrook of Servel, Inc., took several pictures of the group and the presentation of the Charter. Fun was enjoyed by all when the attendance award was given and a mock initiation was inflicted upon five members of the Chapter. The meeting closed with the singing of "America."

MOTOR CITY CHAPTER

Flint, Mich., Aug. 8—Formation of a bowling team was discussed and it was decided to enter three teams representing the Chapter. At this meeting J. Smith from the Penn Switch Co. talked briefly explaining his company's inability to deliver material promptly.

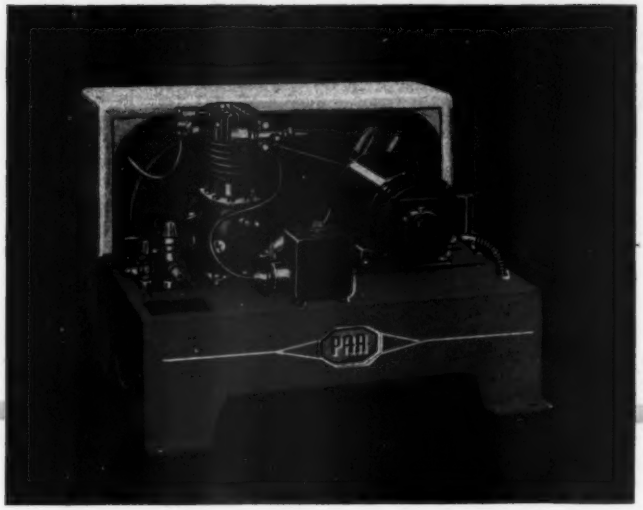
An amusing and interesting program was presented by Norris Gunnell, the educational chairman, having each member demonstrate his particular way of handling various questions that are put to service men by customers.

Aug. 22—At this meeting, Roy Martin of the district O.P.A. explained prices and regulations, and answered a number of questions on O.P.A. regulations as they apply to the refrigerator service industry.

Sept. 12—A joint session with the Lansing and Saginaw Bay City Chapters was arranged, to be held Oct. 10. The educational portion of the meeting was directed by Einer Hansen of the Hansen Refrigeration Co., who presented many points on servicing Copeland, Kelvinator and Frigidaire air conditioning equipment.

PRESENTATION OF CHARTER TO EVANSVILLE CHAPTER:

Left to right: Earl Kinsey, first vice-president; Howard White, second vice-president; E. A. Plesskott, National R.S.E.S. president; Ben Griese, Secretary; Wm. Anglin, local R.S.E.S. president; Charles Powell, treasurer; and P. B. Reed, National R.S.E.S. Educational Chairman.



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CORN BELT CHAPTER

Bloomington, Ill., Sept. 20—The first meeting of the new fiscal year was held in Hotel Rogers. To start the new season off properly, the members enjoyed dinner together in the Mirror Room. The attendance was good in spite of a rainy evening. At the business session following discussion of the Illinois State Convention, it was decided that the Chapter should bid for this convention next year. The question of prospective new members was discussed.

TOLEDO CHAPTER

Toledo, Ohio—The September meeting was held at Redman Hall. A complete report of the picnic held August 27 was given. A considerable amount of time was spent reviewing the possibilities contained in The National Bureau of Standards, regarding condensing units, and a motion was made and carried that the Toledo Chapter accept this Standard and its recommended revision.

Certificate membership was again discussed with the result that 20 members expressed the desire to take the examination. Several movie films were shown, one being "Beachhead Landing at Bougainville" and "Electronics and Its Uses." Applications from two new members, Vern Salsberry and Robert Smith were accepted.

COLUMBUS CHAPTER

Columbus, Ohio, Sept. 13—The first meeting of the fall season drew a record attendance. The speaker of the evening was Ed Graff of the Ranco Co., who is a member of the Chapter.

SAN DIEGO CHAPTER

San Diego, Calif., Sept. 14—The meeting was held at the regular meeting rooms of the Anderson Refrigeration Service Building. President Friedrichs presided and 20 members were present. Applications from three new members were received and turned over to the membership committee for investigation and to be reported on at the next regular meeting. The committee in charge of the proposed fishing trip to Ensenada reported no possible chance to arrange for transportation at this time and the plan was filed until a future date.

A committee was formed to arrange for some means for advertising the Chapter and Society locally. Several ideas were presented. It was stated that a report on progress would be made at a later meeting.

Certificate examination papers were received for members who had requested them. An open discussion on plans for future meetings was held at which a number of good ideas were presented. Following the business meeting, several reels of entertaining and educational films were shown.

SOUTHERN OHIO CHAPTER

Portsmouth, Ohio, Sept. 14—A very enjoyable evening was spent at the regular monthly meeting held at the Central Electric Co. Local Motor Maintenance Shop. Priorities and general topics were discussed. Homer Hall, a member of the Chapter, now in the armed forces, was a visitor.

Following are the officers for 1944-45: *President,* Wm. Journey; *Vice-President,* Geo. P. Kaut; *Secretary-Treasurer,* Forrest D. Poole; *Sergeant-at-Arms,* Francis Overman; *Board of Directors,* W. K. Rea; Ivan M. Wilbur, Ralph E. Ross, Carl Ackley, Homer Hall and Raymond Steiner.

MONUMENTAL CHAPTER

Baltimore, Md., Sept. 13—At this meeting, Jack Ottenheimer, President of the Chapter, spoke on the vocational war production training program opened in Baltimore for training men and women for the refrigeration field. He stressed the opportunity afforded apprentices and service men through this course.

Chas. Logan from Superior Valve and Fittings gave a very interesting talk on how flare units and fittings are made and also showed the construction of hand valves and how to use them to advantage.

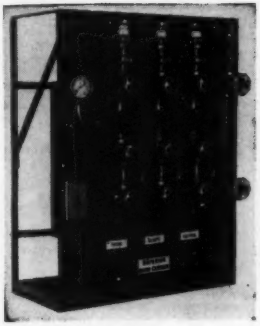
KANSAS CITY CHAPTER

Kansas City, Mo., Aug. 2—Following a short business session, the meeting was turned over to Mr. Schreiber, Chairman of the Educational Committee. He developed the evening's program by opening the Question Box, and holding a general discussion on the questions.

CLEVELAND CHAPTER

Cleveland, Ohio, Sept. 14—The officers and directors held a meeting August 30 to outline an interesting program for the fiscal year. The first meeting was held Thursday evening, September 14, at which routine business was discussed, including classification of memberships. It was announced that arrangements for the annual clam bake had been made to be held Sunday, September 24.

(Continued on page 56)



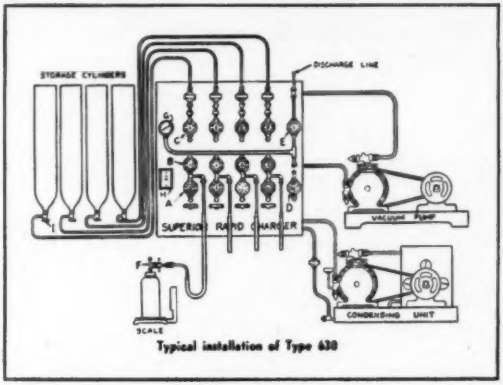
TYPE 630—

Superior RAPID-CHARGERS

Hi-speed refrigerant transfer systems . . . five pounds per minute by actual test.

TYPE 630—illustrated above, is a complete refrigerant transfer system, with all equipment mounted on a special composition panel.

TYPE 631—illustrated below, is recommended for use where evacuation and discharge, and other facilities provided on Type 630 are not required.

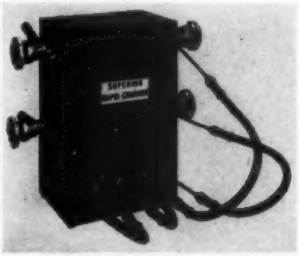


Typical installation of Type 630

RAPID-CHARGER is the result of careful study of all known refrigerant transfer methods, systems and problems pertaining thereto. It has instantaneous liquid coolers—one for each refrigerant to be transferred—connected in series with a refrigerating circuit, using a thermostatic expansion valve, and a small condensing unit with pressure control.

RAPID-CHARGER is fast—no valuable time lost in filling cylinders—no purging necessary. Refrigerant losses are practically eliminated.

If you haven't a copy of Catalog R2, request one today.



TYPE 631

No. 106

SUPERIOR VALVE & FITTINGS COMPANY

PITTSBURGH 26 PENNSYLVANIA

New and Improved Appliances

Information contained in this department is furnished by the manufacturer of the article described and is not to be construed as the opinion of the Editor.

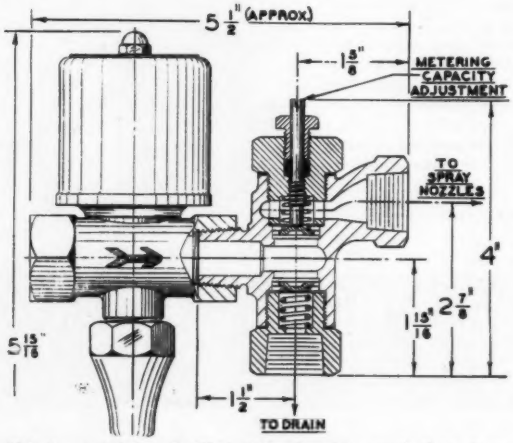
New Metering and Automatic Waste Valve

A NEW metering and automatic waste valve for water supply lines to unheated areas, especially to spray nozzles, has been announced by Alco Valve Company, St. Louis, manufacturers of refrigeration control valves. The new type valve provides two services in one compact assembly—it offers an automatic drain to prevent freezing, and at the same time provides metering means.

Such an arrangement for automatic draining is desirable where spray nozzles on evaporative condensers are located in unheated areas, on supply lines to roof ponds and spray nozzles, and supply lines to outside sill-cocks, etc.

It is ordinarily used in conjunction with a standard solenoid valve which may be controlled by outside thermostats, timers, or any other desired means. Both the solenoid and the metering and automatic waste valve should be installed in a heated area.

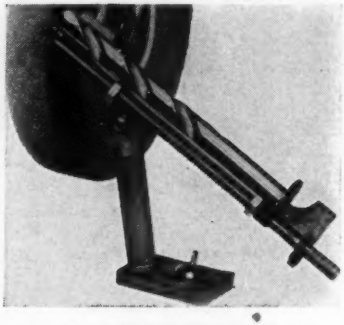
If automatic action is not desired, a hand shut-off valve may replace the solenoid. The automatic waste feature will function when the hand valve is turned off. The capacity metering stem is designed for external adjustment. The device is described in Alco Bulletin D-771.



Metering and Automatic Waste Valve for water supply lines shown with Alco S220 Solenoid Valve

New Jig Announced

FEW mechanics can sharpen a twist drill with any degree of accuracy. Pictured is the Super, a simple jig which enables even a girl to grind a drill to a factory finish in 25 seconds. It retails for only $2.95, complete, fully guaranteed to do the work. The Super is mounted next to a grinding wheel. It handles drills from 3/32 to 1-1/16 in. in diameter, and up to 11 in. in length. Adjustable to either 59°, 69°, or 88° angles.



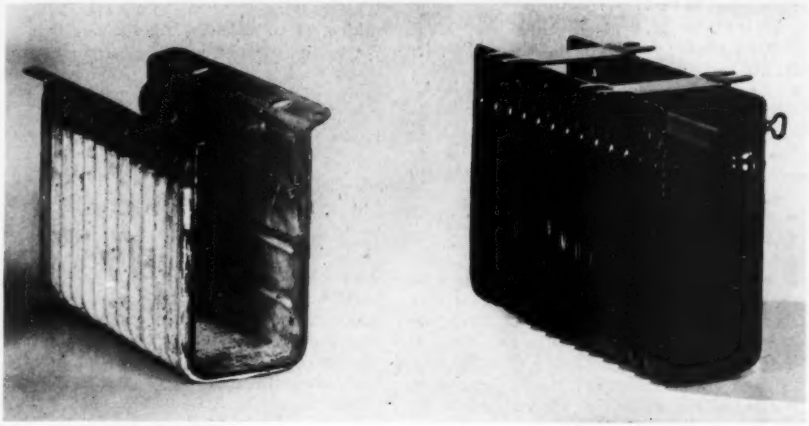
New McBurney Super Jig

Amcoil Conditioner

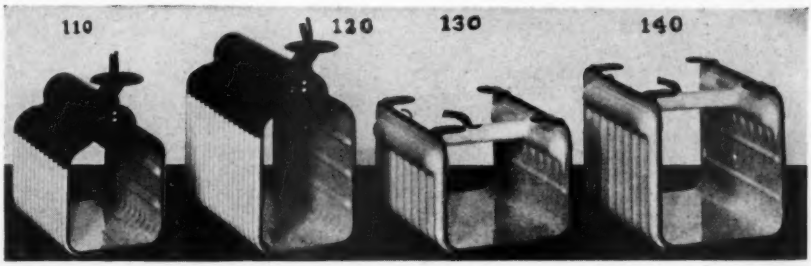
THE AMERICAN COILS, INC., Newark, N. J., has introduced the Amcoil conditioner which provides temperatures down to 35° F. and relative humidities up to 95% in food storage rooms.

Air is drawn into the top of the unit by a fan and directed downward through a casing. The casing is partitioned into two parts, the major portion being occupied by an evaporator coil. The main stream of air passes through this coil and is refrigerated. The balance of the air stream passes downward over water collected in the drain pan recess. An immersion heater, located in the drain pan recess, is energized by a humidistat when higher humidity is required, producing moisture vapor which rises and mixes with the recirculated air. Cooled air and the moisture laden recirculated air mingle and are directed into the refrigerator space by an air control deflector.

Used Evaporators—REPORCELAINED



BEFORE AFTER



EVAPORATORS—FLOODED TYPE

110—2 Tray Goose Neck.....
120—3 Tray Goose Neck.....
130—8½" w. 7½" h. 11½" d. .....
140—8½" w. 9½" h. 11½" d. .....

$6.75

Black, white and combination. On No. 110 and No. 120 leakproof lines $2.50 extra

SPECIAL
REBUILT
One-Button
PENN
Cold Control

Lots of 5

$1.50

PORCELAIN EVAPORATORS
REFINISHED LIKE NEW

Kelvinator, Gibson and All Others; Leaks Welded, Reporcelained in Blue. We have on hand certain models of evaporators to exchange—no waiting. Send in your old evaporator.

N O T I C E—Remove all fittings and no evaporator will be accepted with any welds. Add one dollar for cleaning and flushing out old oil.

EXCHANGE PRICE **$12.50**

WE REPAIR STAINLESS STEEL EVAPORATORS..... **$8.75**

All Prices F.O.B. Chicago, Ill.

ACME REFRIGERATION PARTS CO.

5217 W. Madison St. Telephone Columbus 4141 **Chicago 44, Ill.**

R.S.E.S. CHAPTER NOTES

(Continued from page 52)

MILE HIGH CHAPTER

Denver, Colo., Sept. 11—For the educational portion of the evening's program, H. R. McCombs explained a new capillary tube to be used on Hermetic units and R. C. Kimmel took the floor to explain some bookkeeping procedure for service men. He outlined the steps necessary and entry books necessary for the proper entries of business transactions, and showed by an example how to make up a balance sheet and the profit and loss statement. Since Mr. Kimmel did not have an adding machine, he had a little trouble getting his books balanced, but with the help of the audience, he did make it. He also answered several questions from the floor pertaining to bookkeeping procedure.

It was decided to defer the next meeting to the third Monday in October, instead of the second, to allow the Vice-President, L. W. Barley, to go deer hunting; and who can imagine a refrigeration service man having time to go deer hunting?

SPRINGFIELD CHAPTER

Springfield, Ill., Sept. 23—The meeting was preceded by the annual fall wiener roast, which was held in the Washington Park field house. About 80 per cent of the members, together with their wives, attended.

At the business meeting, a considerable number of members expressed their intentions to attend the state meeting to be held at Peoria, October 14 and 15. Clark Van Pelt was elected as a delegate to the state convention.

Ladies Auxiliary

KANSAS CITY AUXILIARY

Kansas City, Mo., Sept. 6—The resignation of Mrs. H. L. Ward as vice president was accepted with regret and Mrs. L. A. Mendenhall was elected to fill the vacancy. Arrangements were made to send Christmas presents to the boys overseas, details to be handled by Mrs. F. C. Smith and Mrs. H. L. Green.

TWIN CITIES AUXILIARY

Minneapolis and St. Paul, Minn., Oct. 3—Fourteen members and one guest were present at this meeting held at the home of Mrs. Otto Chermak. Cards were played, with Mmes. Holmes and Sigafoos winning two lovely prizes. Mmes. Berheim and Chermak served a nice lunch and a good time was had by all present.

BUFFALO AUXILIARY

Buffalo, N. Y., Sept. 16—The first meeting of the season was held at the home of Mrs. Walter Bobzien at Newfane, N. Y. The subject of an objective for the meetings for the coming season was discussed and Red Cross work was suggested. Following adjournment of the business session, a corn and wiener roast was held, the ladies being joined by their husbands for this event.

MIDWEST JOBBERS ASSOCIATION

THE Midwest Refrigeration Supply Jobbers Association held a meeting at the President Hotel, Kansas City, Mo., September 16. There were 28 members of the Association present, also 34 manufacturers' representatives who had been specially invited and Miss Silvers of the National Jobbers Association.

The discussion covered changes in WPB regulations, deliveries, and prospect for the future of deliveries and changes in merchandise. After the meeting, various groups formed to discuss their local problems with the manufacturers.

PENN OPENS DALLAS BRANCH

ANTICIPATING increased activity in the Southwest, Penn Electric Switch Co., Goshen, Ind., has opened a branch sales office in Dallas, Texas, located in the Wilson Building. This is but another move on the company's part in expanding its facilities and service to its customers for the Post-War period.

RAY P. WAITE

The Dallas branch office will be managed by Ray P. Waite, a graduate mechanical engineer, who also has had considerable experience in electrical and chemical engineering. Mr. Waite was in the public utility business until 1932 at which time he was Vice President and General Manager of a mid-west utility company. Since 1932, he was engaged in consulting engineering and in this capacity has done sales, sales promotion and product research work.

FLASH! JUST ARRIVED!

A RECORD BREAKING SPECIAL PURCHASE OF ALUMINUM ICE CUBE TRAYS AND BRAND-NEW DOMESTIC CONTROLS

ORDER NOW

Heavy Aluminum Ice Cube Trays

No.	Size	No. Cubes		In Lots of	
7004	10⅝ie x 2⅛ x 1⅜	14	Aluminum	10	$0.95 ea.
7005	11⅛ x 2⅛ x 1 11/16	16	Aluminum	10	1.00 ea.
7006	11⅛ x 4 x 2 11/16	42	Aluminum	10	1.50 ea.
7007	11⅛ x 5 x 2 11/16	48	Aluminum	10	1.75 ea.
7008	11⅛ x 5 11/16 x 2⅞	64	Aluminum	10	1.95 ea.
6165	11 x 4¼ x 3¼	48	Aluminum	10	1.75 ea.
6125	11 x 7 x 1½	35	Aluminum	10	1.15 ea.

RANCO ONE BUTTON DOMESTIC COLD CONTROL TYPE R.J.

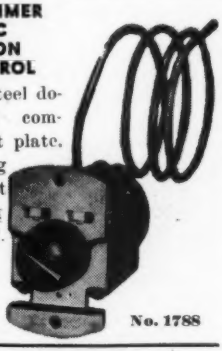
New stainless steel domestic control complete with front plate. Standard setting 15-28. Element 24". Mounting hole centers 2¼".

No. 1116

Each, $3.95

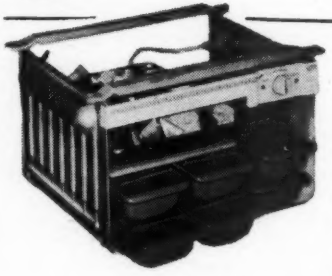
CUTLER HAMMER DOMESTIC ONE BUTTON COLD CONTROL

New stainless steel domestic control complete with front plate. Standard setting 15-28. Element 24". Mounting hole centers 2¼".



Each, $3.95

No. 1788



Electro Tinned Evaporator No. 7908

This beautiful eight tray fast freezing Steel Electro Tinned, dry expansion household Evaporator for freon, methyl or sulphur, ideal for all makes of refrigerators. Has continuous copper tubing metallically bonded below tray. Inlet tube ⅜ in., outlet ¼ in. 13½ in. wide, 9 in. high, 11 in. deep, with front plate. For use with either expansion valve or capillary tubing..... **$11.50**

Evaporator—1—11 x 8½ in., 6—11 x 3¾ in. Steel Trays. Cutler Hammer Cold Control.
No. 7908½—Complete **$21.50**

G & E EQUIPMENT SUPPLY CO.

400 N. Sangamon St. **CHICAGO 22, ILL.**

WRITE FOR LATEST CATALOG

JOE ASKIN JOINS PEERLESS

JOE ASKIN, formerly chief engineer of Fedders Manufacturing Company, Buffalo, New York, for the past 21 years, has joined Peerless of America, Inc. of Marion, Indiana.

JOE ASKIN

With his staff of engineers he is now in the process of redesigning Peerless products and is working 100 percent on post-war plans. Mr. Askin is a graduate of the University of Michigan, in Engineering, Class of 1922. He was Assistant Experimental Engineer with Edison Electric Appliance Co. of Chicago and later was Assistant Experimental Engineer with Harrison Radiator Division of General Motors Corporation.

He has had about 35 patents granted on heat transfer surface, refrigeration apparatus, and air conditioning equipment. Since 1928 he taught refrigeration and air conditioning to the night school classes at Seneca Vocational High School, Buffalo, N. Y. From 1934 to 1941, he was technical editor of the Fedders News, writing monthly articles on electric refrigeration and air conditioning equipment.

From 1940 to 1941, he was Consulting Engineer for Standard Aircraft Products Company, Dayton, Ohio. He also has obtained several patents on aircraft radiators and oil coolers.

STEENSTRUP, GENERAL ELECTRIC ENGINEER, RETIRES

CHRISTIAN STEENSTRUP, engineer in charge of General Electric's Refrigeration Engineering division, who developed the hermetically sealed refrigerator unit and is called the "father" of the company's famous suggestion system, after 43 years of distinguished and efficient service has requested to be relieved of his responsibility as head of the division, according to an announcement by J. M. Howell, manager of the Schenectady works. However, Mr. Steenstrup will continue for the present as consultant.

AUTOMATIC CONTROLS

. . . bearing this trademark belong to a large and widely-used line of Automatic Temperature, Pressure, and Flow Controls. Many years of successful operation in serving domestic, commercial, and industrial users have given General Controls a thorough knowledge of field problems and the engineering skill to solve them. This experience is available to you in helping you analyze *your* particular problem and recommending the Automatic Controls to fit your specific needs.

For complete specifications on GENERAL CONTROLS' broad line of Automatic Pressure, Temperature and Flow Controls, write for Catalog 52.

GENERAL CONTROLS
801 ALLEN AVE. GLENDALE 1, CALIF.
BRANCHES: BOSTON • NEW YORK • DETROIT • CHICAGO
DALLAS • KANSAS CITY • PHILADELPHIA • ATLANTA
CLEVELAND • DENVER • SAN FRANCISCO

Mr. Howell also announced the appointments of D. F. Newman, engineer, succeeding Mr. Steenstrup, and L. W. Atchison, assistant engineer, effective September 1. Mr. Newman was formerly assistant engineer, and Mr. Atchison, designing engineer. Advocate of the modern mass production of electric refrigerators, Mr. Steenstrup has 118 patents covering many phases of refrigerator manufacture and engineering.

S S S

NEW WEATHERHEAD APPOINTMENTS

ELEVATION of three executives of The Weatherhead Company to vice presidencies, and the appointment of a fourth to the post of assistant to the president, is announced by A. J. Weatherhead, Jr., president of the Cleveland, Ohio, firm. H. Church is the newly appointed vice president in charge of sales; George H. Hufferd becomes vice president in charge of engineering; and Robert P. Gibson will serve as vice president in charge of automotive sales for The Weatherhead Company. Morris H. Wright is the new assistant to the president.

ALCO ADVANCES MEYER

THE appointment of Richard N. Meyer as field manager of the St. Louis territory of Alco Valve Company, makers of refrigerant control valves, has been announced. The territory includes the entire states of Kansas, Missouri, Arkansas and Kentucky. Also included are southern Illinois, southern Indiana and the western portion of Tennessee.

RICHARD N. MEYER

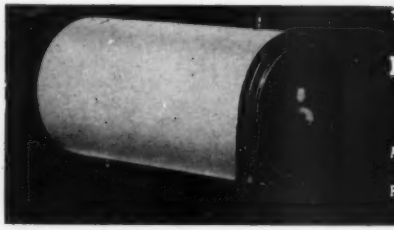
Mr. Meyer has been manager of Alco's service department for the last two years. He studied commerce and finance at Washington University and entered the refrigeration and air conditioning field in 1932 for the distributor of General Electric in St. Louis. From 1934 until 1941 he was sales engineer with the St. Louis branch of the York Corporation and joined the Alco staff later that year.

NORMAL SUCTION PROCESS WATER COOLERS

6 to 25 gallon capacities.

Compact in design . . . can be mounted on floors, walls or ceilings.

Suitable for drinking water bubbler service, cafeteria or restaurant glass filler service.



DAY AND NIGHT

WRITE FOR LATEST DATA

COOLER DIVISION
DAY & NIGHT MFG. CO.
MONROVIA • CALIFORNIA
FACTORY REPRESENTATIVES
NEW YORK — A. C. Homeyer, 682 Bdwy. • CHICAGO — Marc Shantz, 565 Wash. Blvd
ST. LOUIS — R. H. Spangler, 3331 Market St. • ATLANTA, GA. — J. E. Parker, 294 Peachtree, N. E.

Individually tested for efficient, economical operation. WP regulating valves may be mounted in any position and will give lasting, trouble-free performance. Brass body, two ply power bellows and corrosion resistant materials for all internal parts. They are designed not only to start and stop the flow of water but also to feed the economic amount of cooling water to secure the proper condensing pressure without waste. The water flow increases and decreases with the rise and fall of actuating pressure.

WP regulating valves are available in ⅜", ½" and ¾" FPT sizes and other valves of other types are available in sizes ranging from ⅜" to 2" FPT.

Write for a copy of our latest catalog.

Electrimatic

2100 INDIANA AVENUE

CHICAGO 16, ILL.

PENN BUILDS NEW OFFICE ADDITION

PERMISSION by the War Production Board for the construction of additional office space to relieve the present congestion and inadequate facilities for the company's workers has been announced by the Penn Electric Switch Co., Goshen, Ind. This is the fourth building expansion for Penn since its move to Goshen from Des Moines during the summer of 1937. The first three were factory additions, one in the Fall of 1941, another in the following year and the third constructed during the late summer of 1943.

It is anticipated that the additional office space will be ample for present needs as well as for the expected expansion during the post war period. Penn manufactures automatic controls for heating, refrigeration, air conditioning, pumps and air compressor service as well as safety controls for internal combustion engines.

The new addition will be a continuation of the present office building and will be two stories high measuring 42 feet in width by 74 feet in length and conform to the present building's architectural style. When completed, the new quarters will house on the first floor, the entire engineering department including test engineers, designers, and draftsmen. The new portion of the second floor will be occupied by the accounting, cost and payroll departments.

The present first floor of the office building will be devoted entirely to the production department and the present second floor will house the sales and advertising departments.

BAILLIE HEADS AMERICAN GAS MACHINE CO.

THE resignation of J. W. Baillie, secretary and treasurer of the Detroit Lubricator Co., has been announced by C. H. Hodges, president, effective December 1, 1944. On that date Mr. Baillie will become active president of the American Gas Machine Co., Albert Lea, Minn., on whose Board of Directors he has served for the past three years and in this capacity has been in close touch with the company's various activities. Mr. Baillie leaves the Detroit Lubricator Co. with the best wishes of his associates for his continued success in the new position.

Service
on all makes of
REFRIGERATORS

and that includes
SERVICING
METER-MISERS
WITH
HERVEEN
the IDEAL
REPLACEMENT GAS

The qualified service engineer knows that extra profits are made by servicing all makes of equipment. These extra profits include servicing Frigidaire Meter Misers. It's no trick at all with *Herveen.*

About 75% of the service calls on Meter Misers are the results of leaks. Why not get this additional service business when Herveen is readily available for you?

Additional profits are being made every day by service engineers who stock Herveen.

Most jobbers carry Herveen. If yours does not, write direct to the

MODERN GAS CO., Inc.
Manufacturers and Refiners
1084 Bedford Ave., Brooklyn 5, N.Y.

Getting Nowhere FAST

There are some men in refrigeration (newcomers, as well as old-timers), who keep plugging along, getting nowhere fast. Oh yes, they know the refrigeration business well enough to dub their way along—and that's about all. Compare them with the boys who know that, to keep on making the big money in the refrigeration business, you've got to be ready for anything—know all the answers—*be progressive.*

U.E.I. BALANCED TRAINING

(home-study instruction *balanced* with actual shop practice) is designed to help a man *make headway,* no matter how old or young he is in the business. It is the refrigeration and air conditioning training that has been proving its value for the past 17 years.

See the coupon below? Plenty of men—men in practically every branch of refrigeration work—have used a similar coupon to find out how to start getting SOMEWHERE instead of nowhere, by means of interesting spare-time training. Do you think *you* should send it in?

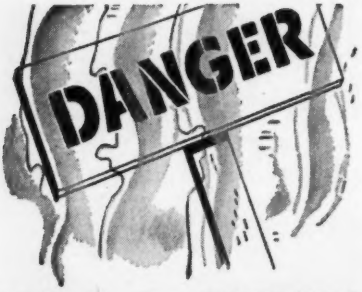
FREE FACTS
UTILITIES *Engineering Institute*
1314 W. Belden Ave.
Dept. 45, Chicago 14, Ill.

Please give me more information about Refrigeration and Air Conditioning Training, as promised in your Refrigeration Service Engineer October, 1944 ad.

Name .....

Address .....

City ..... State .....



Injurious FUMES!

● Whether refrigeration gases are fatal or merely irritating, maximum protection is a safety requirement. The first step is to disperse fumes if possible. Then . . .

call for CESCO

CESCO's No. 605 Fume Kit offers *triple protection* to refrigeration servicemen. Quick-change filter cartridges provide safety against ammonia fumes, methyl-chloride and sulphur-dioxide . . . *all in one convenient kit.* The soft molded rubber face-piece of the fume mask, and the instantly adjustable headgear, assure a gas-tight, comfortable fit for every wearer. Large safety glass lenses give perfect visibility.

For full information, write for CESCO's No. 605 bulletin today.

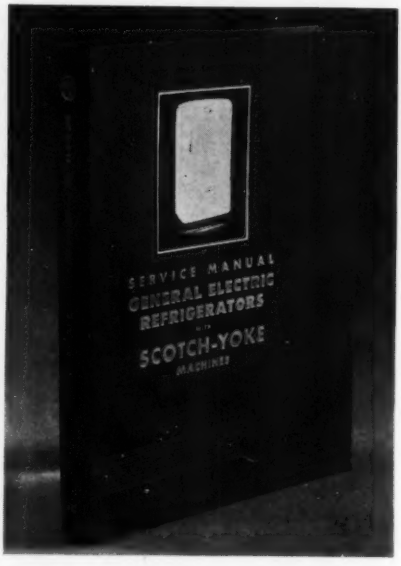
CESCO

CHICAGO EYE SHIELD CO.
2344 Warren Boulevard
Chicago 12, Illinois

CESCO FOR SAFETY

NEW SERVICE MANUAL BY G.E.

THE most comprehensive household refrigerator service manual ever offered by General Electric's appliance product service section to servicemen has been released for distribution. It covers all models equipped with the G-E Scotch-Yoke Sealed machines.



In a letter to distributors, W. C. Noll, section manager, says the manual contains the service information on all G-E Sealed machines manufactured since 1934, "and there are well over 8,000,000 of these machines in customers' homes." The many different models include the later style Monitor Tops, all the Sealed Flatop models and the numerous special cabinet types.

All information in the manual is easy to find and use with the expanded cross-reference type index. All the "whys" and "hows" are covered. Well illustrated with over 300 pictures and drawings the new manual has more than 200 pages. Detailed descriptions give a full understanding of the machines and cabinets and all possible adjustments are clearly outlined.

Sturdily bound, the manual is 8½ by 11 inches. A heavy cover affords protection from hard usage. The book is distributed through General Electric distributors.

Safety Light . . . Justrite
for REFRIGERATION SERVICE

Now, the New! JUSTRITE SERVICE FLASHLIGHT

The new "he-man" flashlight designed for safety and rugged service.

1500 candlepower . . . 3 standard cells for powerful light and dependable service. Plastic case with Justrite Safety Features "sealed-in." Fits in the palm of your hand, on belt clip or finger ring . . . the light that's there when and where you want it.

Approved by Underwriters' Laboratories, Inc., and U. S. Bureau of Mines for safety in the presence of many flammable gases and in other hazardous locations.

Available on early delivery for orders with priority rating.

Write today for complete details . . . Justrite Safety Products are designed and manufactured to give you maximum safety and dependable service.

JUSTRITE MANUFACTURING COMPANY
2063 N. Southport Ave., Dept. B-7, Chicago 14, Ill.

COUNT ON THE SERVICE
this HEAVY-DUTY FAN offers

★ **NOW AVAILABLE** is this new 1/90 h. p. 1740 r. p. m. Heavy-Duty Fan designed to meet Grunow's rigid requirements for quality.

Three of the important reasons why you'll get extra service from this fan are:

1 Motor has heavy-duty ground shaft with special self-aligning, oiling type, oversize bearings.

2 Lifetime supply of oil is sealed in motor.

3 Dynamically balanced rotor assures smooth running, vibration-free operation.

★

Do you have a copy of the
NEW GRUNOW SERVICE MANUAL?
Send for it today! Price 50c

Grunow
AUTHORIZED SERVICE, INC.
4313 W. Fullerton Avenue, Chicago, Illinois

FACTORY TESTED PARTS

Millions
now in daily use

● Always remember, Aerovox has made the major portion of those millions of motor-starting capacitors now in daily use. And Aerovox is offering the outstanding line of Victory replacements to help you keep those refrigerators going for the duration at least. ● Ask our jobber for Aerovox motor-capacitor replacements. Ask for latest listings. ● Or write us direct.

AEROVOX *Capacitors*
INDIVIDUALLY TESTED
AEROVOX CORP., NEW BEDFORD, MASS., U. S. A.
In Canada: AEROVOX CANADA LTD., HAMILTON, ONT.
Export: 13 E. 40 St., New York 16, N. Y. Cable: ARLAB

MANUAL ON POSTWAR USES OF EXPLOSIVE RIVETS

USES of explosive rivets in peacetime production jobs, in addition to application in the aviation industry which is taking virtually all the supply now—are discussed fully in a new manual published by E. I. du Pont de Nemours & Co., Wilmington, Delaware.

The explosive rivet was developed to meet the need for a quick, sure "blind" fastening in the hard-to-get-at places in aircraft. First a rivet was made with a small explosive charge in the end of the shank. Heated by an electric riveting iron, a barrel-shaped closing head is formed by the explosive charge.

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The Du Pont booklet cites the following possibilities among others, for postwar uses of explosive rivets:

Refrigeration—in the construction of cabinets for the home, the locker plant and the farm.

Heating, Ventilating and Air Conditioning—in the construction of the units and the closing of ducts which can be reached only from one side.

Radio Manufacture—in sealing radio units and the production of cabinets.

Household appliances—in the manufacture of washing machines and other household aids, even to attaching name plates.

The booklet may be obtained by writing E. I. du Pont de Nemours & Co., Inc., Explosives Department, Wilmington 98, Delaware.

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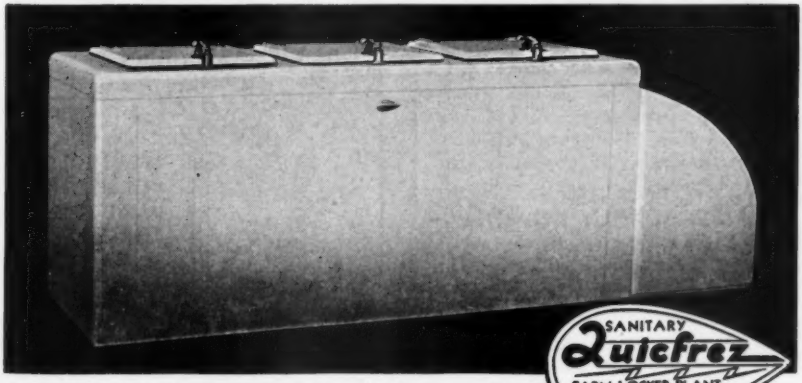

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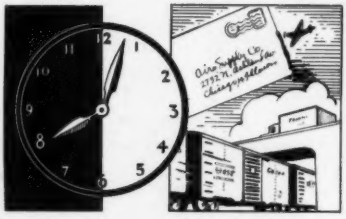

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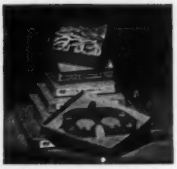

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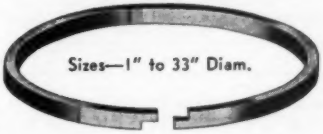

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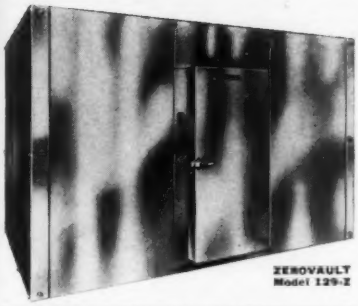

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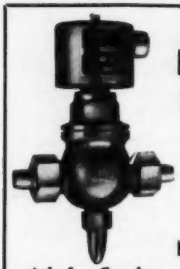

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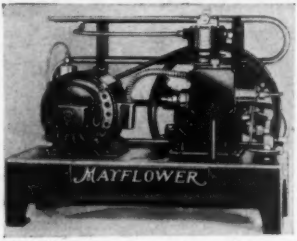

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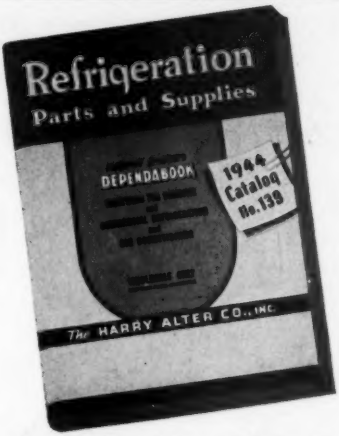

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Index to Advertisers

Acme Control Service 71
Acme Refrigeration Parts Co. 55
Aerovox Corporation 64
Airco Refrigeration Parts 66
Airo Supply Co. 66
Alco Valve Co. 11
Alter Company, The Harry ..... 71 and 72
Ansul Chemical Company 1
Audel & Co., Theo. 49
Auto-Diesel Piston Ring Co. 67
Automatic Heating & Cooling Supply Co. 67
Automatic Products Company ..... 36 and 37

Berdor Electric Co. 68
Blythe Company, H. W. 69
Bonney Forge & Tool Works ..... Back Cover
Brunner Mfg. Co. 12

Chase Refrigeration Supply Co. 68
Chicago Eye Shield Co. 62
Chicago Seal Co. ..... Inside Front Cover
Chicago-Wilcox Manufacturing Co. 66
Commercial Trades Institute 66

Davison Chemical Corp. ..... Inside Back Cover
Day & Night Mfg. Co. (Cooler Div.) 59
Detroit Lubricator Co. ..... 2 and 3
Dole Refrigerating Company 68
Du Pont de Nemours & Co., E. I. 10

Edison Cooling Corp. 70
Electrimatic Valve 60

G & E Equipment Supply Co. 57
General Controls 58

Henry Valve Company 39
Highside Chemicals Company 9
Hubbell Corporation 70

Imperial Brass Mfg. Co. 47
Jarrow Products 70
Justrite Mfg. Co. 63

Kerotest Mfg. Co. 43
Kramer Co., Fred C. 70

Lynch Mfg. Co. 51

Mayflower Products, Inc. 71
McIntire Connector Company 13
Miller & Seddon Co., Inc. 68
Modern Gas Company, Inc. 61
Mueller Brass Company 16

Nash-Kelvinator Corp'n. 6
New Duty 67
Nobs Chemical Co. 66

Ranco, Inc. 14
Refrigeration Equipment Co. 71
Refrigeration Surplus Dealers 67

Sanitary Refrigerator Co. 65
Servel, Inc. 70
Service Parts Company 69
Spoehrer-Lange Co. 8
Standard Solvent Co. 69
Stangard-Dickerson Corp. 67
Superior Valve & Fittings Co. 53

Tecumseh Products Company 45
Temprite Products Corp. 7

United Speedometer Repair Co. 69
Utilities Engineering Institute 61
Utility Thermostat Co. 70

Virginia Smelting Co. 4

Weatherhead Co., The 5
Western Thermal Equipment Company 65
White-Rodgers Electric Company 41
Wilson Cabinet Co. 69

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